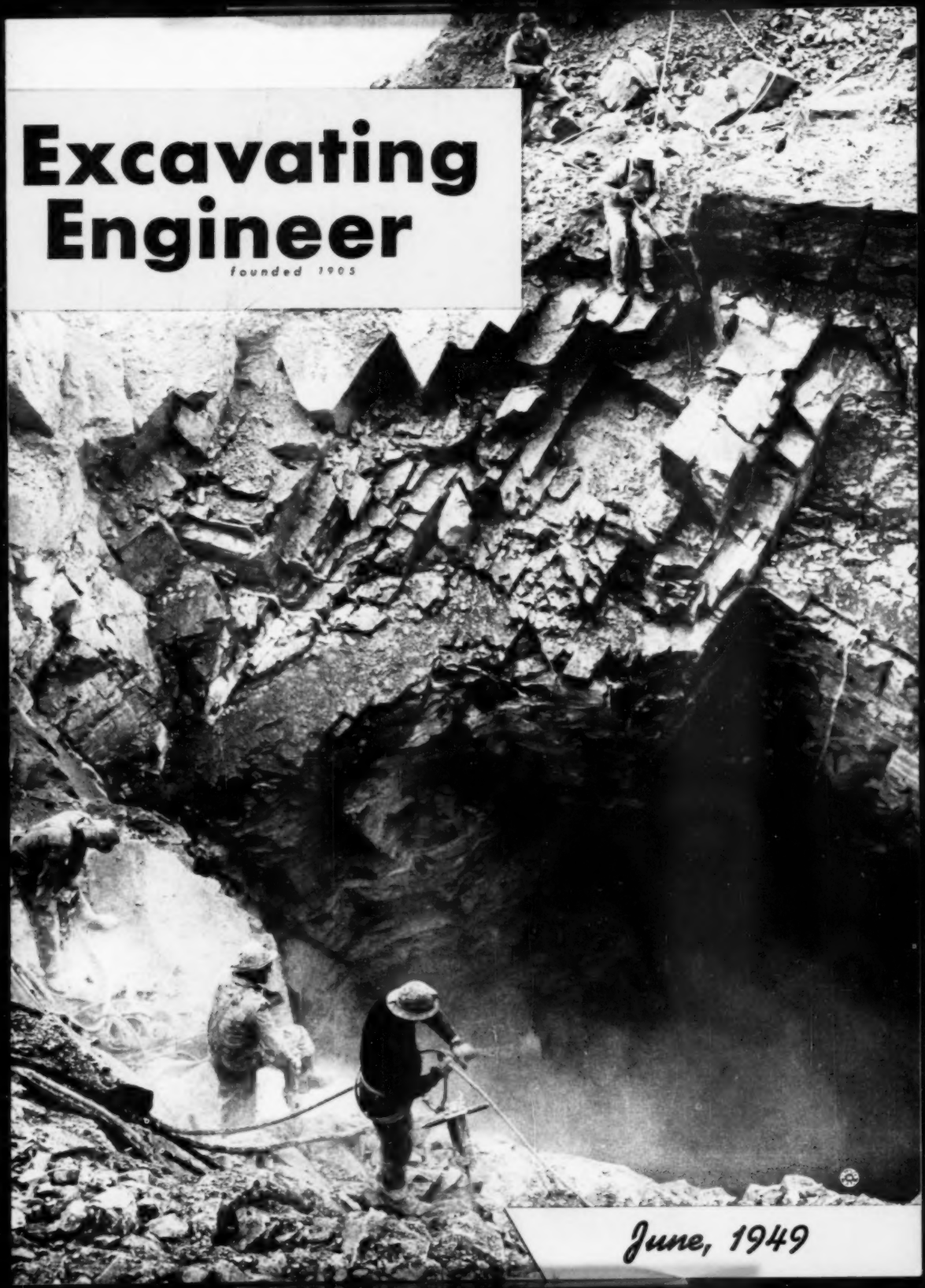
Excavating Engineer

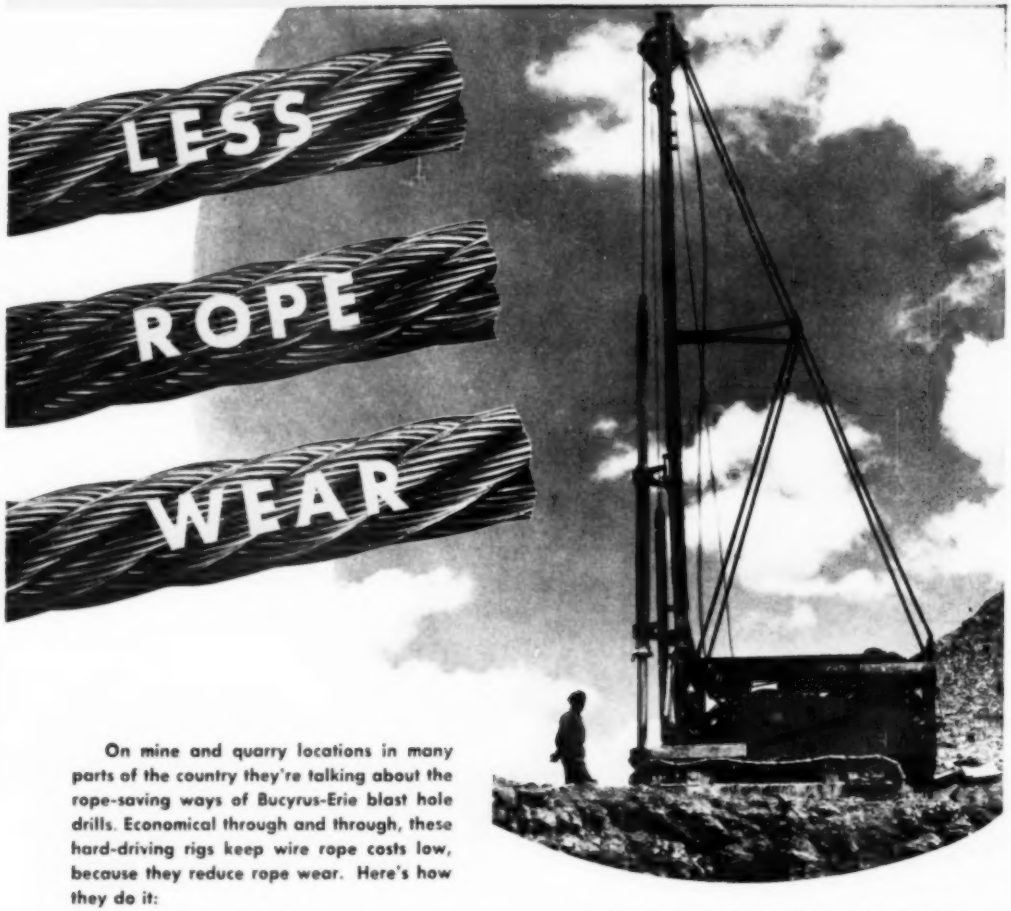
founded 1905



June, 1949

BUCYRUS ERIE

How Blast Hole Drills Can Save You Money



On mine and quarry locations in many parts of the country they're talking about the rope-saving ways of Bucyrus-Erie blast hole drills. Economical through and through, these hard-driving rigs keep wire rope costs low, because they reduce rope wear. Here's how they do it:

1. Derrick-head shock absorber reduces rope strain, imparts extra resiliency, and absorbs peak shock loads.

2. Spudding beam and heel sheaves are rubber insulated. Live rubber rings between sheave and rim reduce the detrimental effect of shock and vibrations on wire rope.

3. Grooved drums mean even spooling . . . help prevent wire rope from twisting or kinking.

4. Sheaves over which wire rope travels are big. They present a large bend-radius, thus decrease line strain.

It will pay you to check these Bucyrus-Erie blast hole drills when you plan your new equipment purchases:

22-T	5⅝"	to	6⅝"	holes
27-T	6 "	to	6⅝"	holes
29-T	6 "	to	9 "	holes
42-T	9 "	to	12 "	holes

Gasoline or electric power is available for all machines . . . diesel for all except the 22-T.

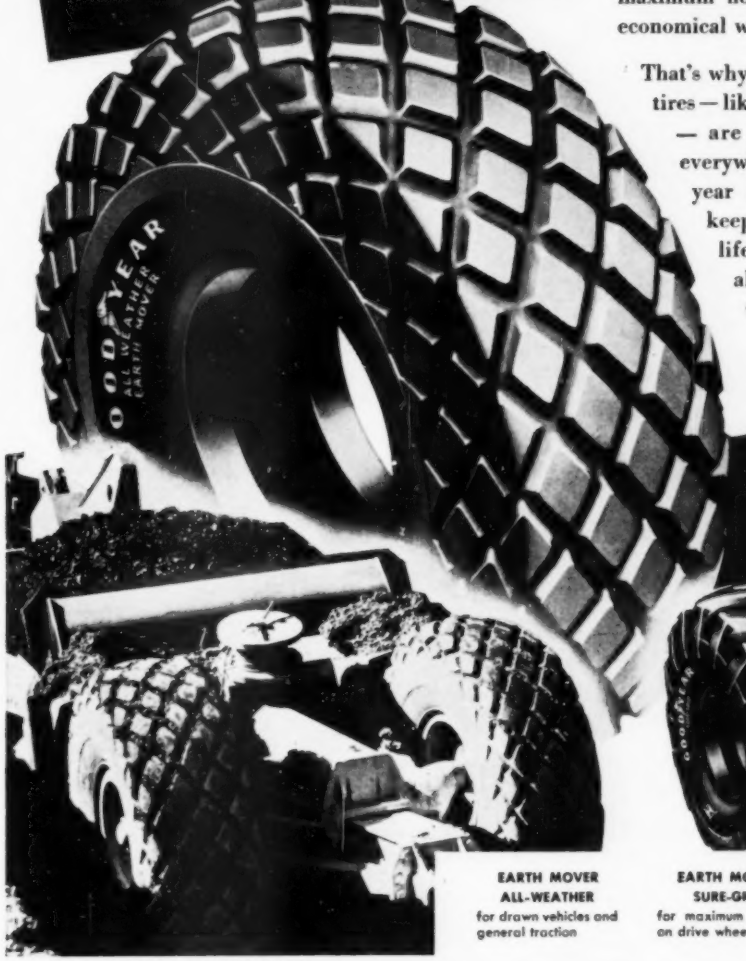
BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

26948G

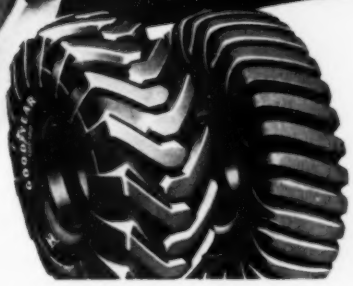
for BIG loads at LOW cost!

Here's the work tire that's unequaled for rolling yardage — on schedule at rock-bottom cost. Notice the large diamond pattern — it distributes the load evenly, carries maximum loads over all kinds of terrain. This Goodyear-designed tread reduces cutting and snagging — gives maximum flotation in soft going, and economical wear on firm-surface roads.

That's why Earth Mover All-Weather tires — like *all* Goodyear work tires — are first choice with users everywhere. They stay first choice year after year, because they keep delivering low-cost, long-life performance. Remember, always BUY and SPECIFY Goodyear—it pays!



A right tire for each job!



EARTH MOVER ALL-WEATHER
for drawn vehicles and general traction

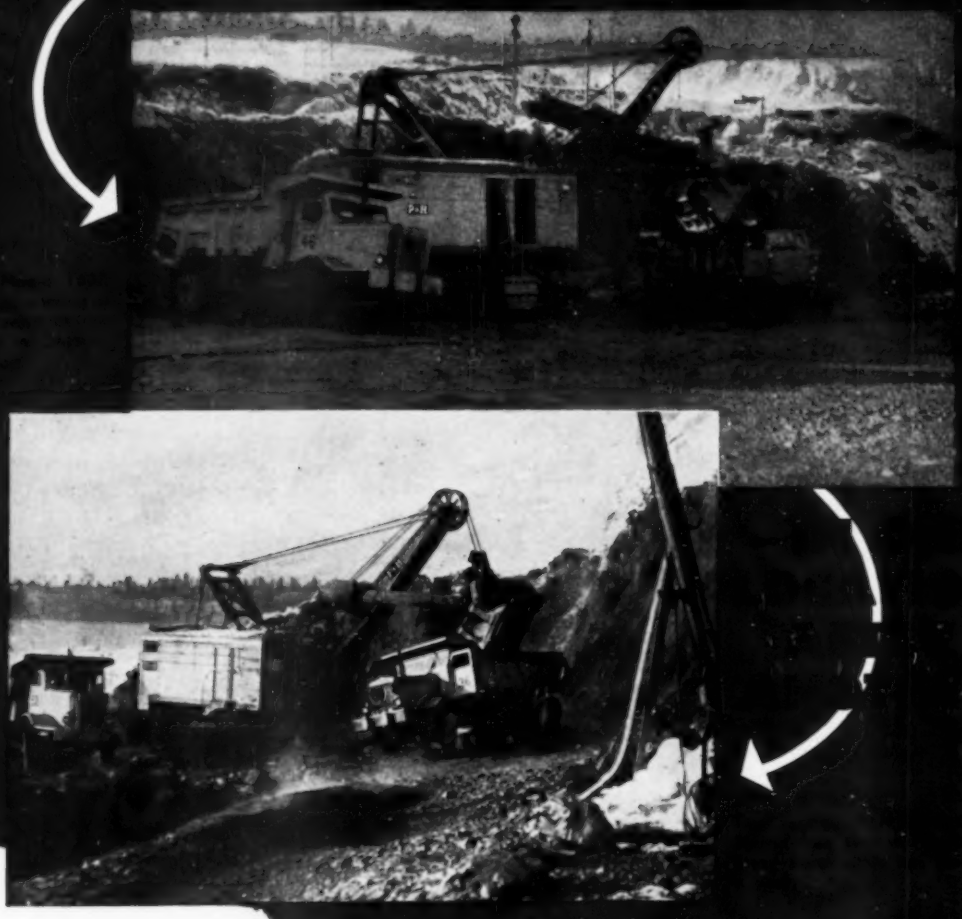
EARTH MOVER SURE-GRIP
for maximum traction on drive wheels

HARD ROCK LUG
for super-stamina in all rock work

All-Weather, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company

GOODYEAR

MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND



Why are more and more large operators reordering P&H Electric Shovels? The reason is clear — lower operating costs. They've piled up the proof with Added Values like these:

1. "*Magnetorque*"* *Drive*— hoists the dipper with electro-magnetic power — lowers with less than half the usual inertia to overcome. It's faster.
2. "*Magnetron*" *Control*—entirely eliminates control fingers and contactors. It's simpler, more dependable.
3. *Independent Propel*—eliminates sliding gears, brakes, clutches and their controls — provides faster move-up.
4. *Air-filtered cab*—pressurized to allow only clean, fresh air to enter — no dust to damage electrical equipment.

Yes, proof on the job makes P&H the choice of discriminating buyers — leads to one repeat order after another. Investigate before you invest.

* T. M. of the Harnischfeger Corporation for Electro-Magnetic Type Clutch

ELECTRIC SHOVELS
4517 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

Every third P&H Electric Shovel sold is a repeat order

LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENT

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Excavating Engineer

founded 1905

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On Our Cover

Jackhammermen and scalers trim rock from the mouth of the 35-ft. diameter spillway tunnel being bored at Hungry Horse Dam, Mont. Overflow from the 3½ million acre-ft. reservoir cascading over the lip of this "glory hole" will drop 490 feet on its 1,125-ft. journey under the dam to the South Fork of the Flathead River. (Turn to p. 36.)

Ninety Feet a Day Underground 12

Fast, efficient removal of excavated material helped Paschen Contractors, Inc., Chicago, mine 90 and line 100 feet of 7-ft. tunnel a day on its $3 million North Shore intercepting sewer job for the Chicago Sanitary District.

Sand Draining Secauscus' Muck 18

Building a super highway over deep swamplands like New Jersey's Secaucus marshes would normally be a very expensive and time-consuming operation. Geo. M. Brewster & Son, Inc., Bogota, N. J., saved much excavation and settling time on its recent S-3 highway job by using the Porter method for under-drainage.

Lilliputian Rigs Solve Forest Problem — by Tom Riley 20

An army of miniature dozers, graders, ditchers and other pint-sized equipment developed by the U. S. Forest Service has been enlisted in a long-range war on that old enemy—fire. Powerful versions of "big brother" models, the small units are cutting and grading a network of 3-ft. forest trails.

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Put more opportunity into your company's future

WITH THIS FIVE-STEP PROGRAM

Here's an easy-to-follow program that will substantially increase your company's chances for a prosperous future.

Nation-wide experience in 20,000 companies proves that this popular program also pays off handsomely *today*. It increases each participating employee's peace of mind—making him a more contented, more productive worker. It reduces absenteeism, lowers accident rates, increases output, and improves employee-employer relations!

This program is simply a proved formula for building membership in the Payroll Savings Plan—the "automatic" system by which millions of workers are investing in U. S. Savings Bonds every pay-day.

What Are the Five Steps?

The benefits of the Payroll Savings Plan to your company are in proportion to the percentage of employees who participate. Nation-wide experience indicates that 50% of your employees can be persuaded to join *without high-pressure selling*. Here are five steps which have proved to be the "magic formula" for putting over the Plan. They will get results for you:

1. See that a top management man sponsors the Plan.
2. Secure the help of the employee organizations in promoting it.
3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.
4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Check up on the Payroll Savings Plan in your company. If fewer than half of your employees are participating, you have a lot to gain by following the five-step program outlined here. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bond Division. While it's on your mind, why not call him right now? Or write the Treasury Department, Washington 25, D. C.

Are You With It?

In the current national Savings Bonds campaign, May 16-June 30, the Treasury Department asks each company operating the Payroll Savings Plan to canvass all employees, with the goal of having at least half of them signed up by the end of the month. This advertisement tells how you can achieve that goal most easily.

The Treasury Department acknowledges with appreciation the publication of this message by

Excavating Engineer

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Buy for the TOUGH JOBS!

. . . and the easy jobs take care of themselves!

Another Northwest in Rock! — and did you ever notice how many Northwests you see in rock?

It has everything a real Rock Shovel needs and when you have a real Rock Shovel you never have to worry about output in any kind of digging.

The Dual Independent Crowd — independent plus automatic — utilizes force other shovels waste. Cast steel machinery bases and machinery side-frames keep shafts in alignment and reduce wear on bearings under the strain of rock digging. The Cushion Clutch eliminates the effect of shock overload on parts under power. The "Feather-Touch" Clutch Control increases output by assuring easier operation and the *feel of the load* when handling the "big ones". These are just a few of the advantages you won't find on other shovels — just a few of the features that will make more money for you in the heart of your job. Plan ahead to have a Northwest for your *Key Spots*. Let us tell you how.

NORTHWEST ENGINEERING CO.
1506 Field Bldg., 135 South LaSalle Street
Chicago 3, Illinois

only the best for the heart of the job

MAKE YOUR KEY MACHINE A REAL ROCK SHOVEL

PROFIT

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

"Caterpillar"

This D8 Tractor with hydraulic-controlled No. 8S Bulldozer, owned by George & Lynch, Inc., Wilmington, Del., is working on a road near Cambridge, Md.

A "Caterpillar" Diesel D8 Tractor with cable-controlled No. 8S Bulldozer at work on a highway at Davis Dam, Arizona. Owned by Utah Construction Co., Kingman, Arizona.

MOVE

THERE are five good reasons why "Caterpillar" Bulldozers — cable or hydraulic controlled — regularly out-produce other units and get the call from owners everywhere.

1 The blade is scientifically curved to keep material rolling smoothly ahead. "Caterpillar's" long experience with motor grader blades helped in its design. It's a lot easier to *roll* dirt than to push it.

2 Controls (cable or hydraulic) give the operator instant, accurate control of the cut. No time is wasted in spinning tracks or excessive lugging down. Only "Caterpillar" cable control has multiple-disc, metallic-lined clutches for easy engagement and disengagement. There's no clutch drag.

3 Angling, tilt and tip adjustments are easy to make — a quick, one-man job for the operator.

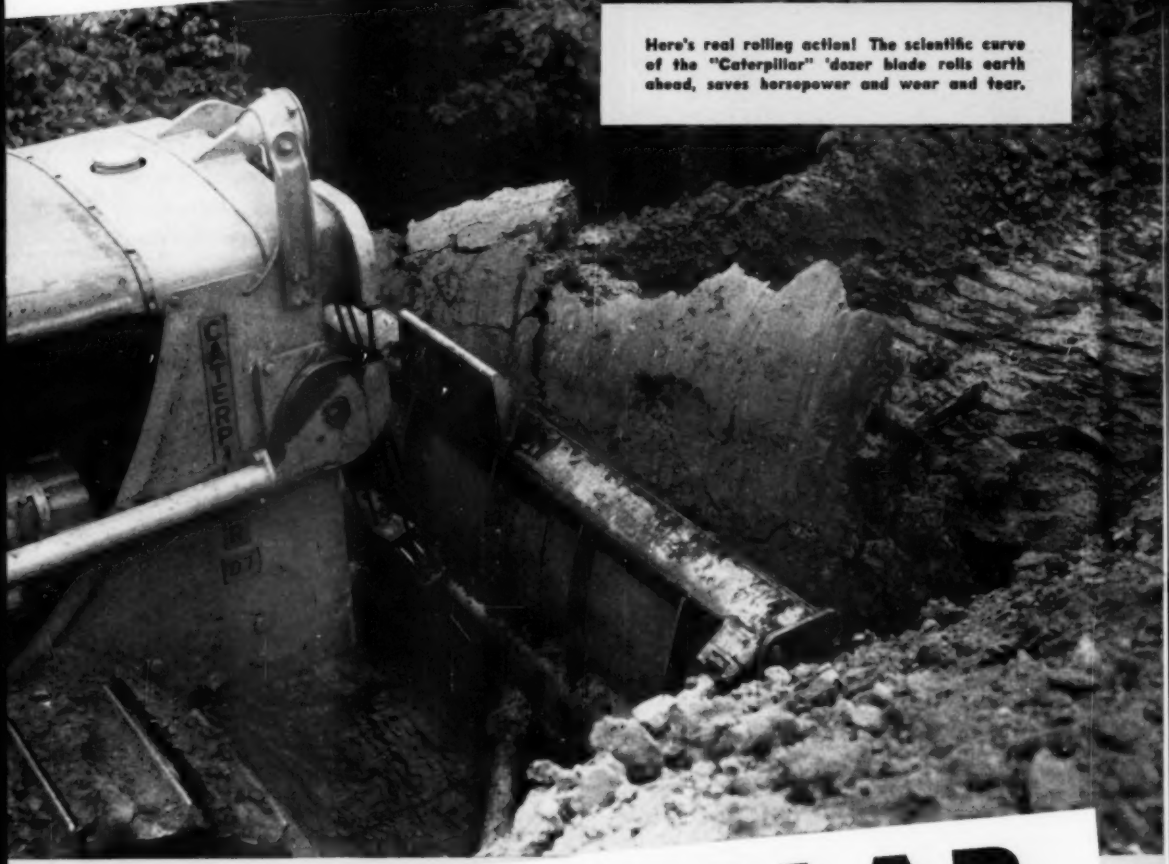
4 There's long life in every blade. "Caterpillar" pays up to 30% premium for the high tensile steels that go into these 'dozers.

5 No overhead frame to interfere with visibility. The operator has a full view of the job.

Your "Caterpillar" dealer is as near as your telephone. He can advise you on your bulldozer needs, and he can get 'dozers for quick delivery. It will pay you to get your order in today.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

'Dozers THE EARTH



Here's real rolling action! The scientific curve of the "Caterpillar" 'dozer blade rolls earth ahead, saves horsepower and wear and tear.

CATERPILLAR

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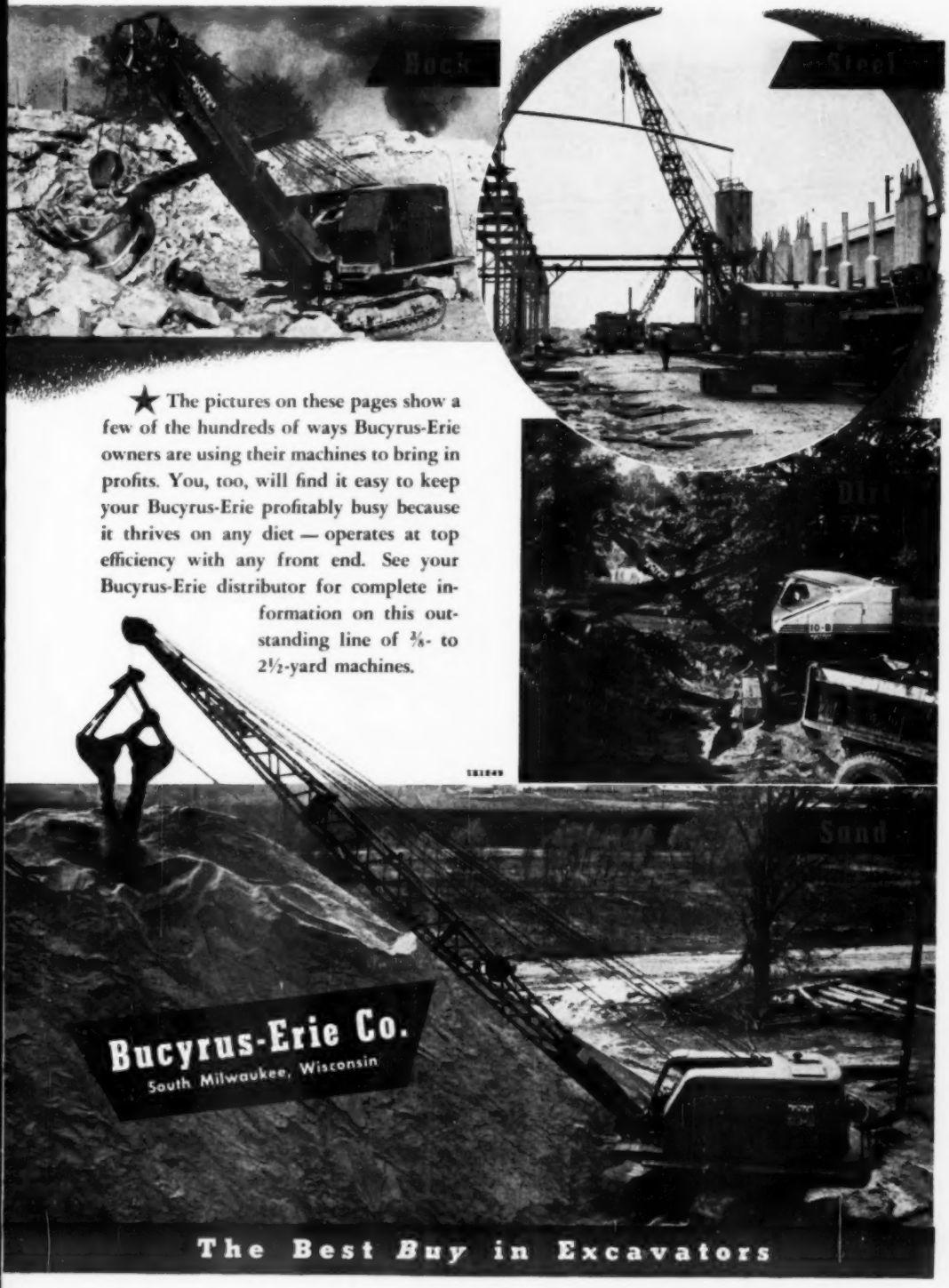
DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

BUCYRUS ERIE

EXCAVATORS Thrive on Any Diet

★ Name your digging or lifting problem — you can handle it fast and economically with a Bucyrus-Erie. There's strength, durability, and power for big output in tough digging. There's speed, smoothness, and precision control for fast accurate loading and load placing. There's speedy convertibility in the field for easy matching of front end to job, and there's design that brings out the best operating characteristics of each front end.

The *Best* Buy Bucyrus



★ The pictures on these pages show a few of the hundreds of ways Bucyrus-Erie owners are using their machines to bring in profits. You, too, will find it easy to keep your Bucyrus-Erie profitably busy because it thrives on any diet — operates at top efficiency with any front end. See your Bucyrus-Erie distributor for complete information on this outstanding line of ⅜- to 2½-yard machines.

The Best *Buy* in Excavators

THE TIGER BRAND SPECIALIST SAYS—
"It's not use but abuse
USS
AMERICAN
TIGER BRAND
WIRE ROPE
UNITED STATES STEEL

that determines wire rope life"

check your application

"Everything was wrong on this job. When I arrived the superintendent and the operator were having a terrific argument. The 'Super' claimed that the operator was wearing out wire rope twice as fast as anybody else on the job. The operator blamed the machine. I could see that nobody knew the real source of trouble.

"I offered to give them a complete check-up and they both jumped at the chance. It turned out that they were using cast iron sheaves which were too soft. To make it worse, the wire rope was not preformed and tended to twist and squirm as it passed over the sheaves.

"The rope bit into the sheaves and the sheaves got rough and chewed up the rope.

"That's the story. I recommended harder manganese steel sheaves and Excellay Preformed Wire Rope. With the right rope for the job, they ought to get twice the service."

How proper wire rope application saves you money

There is always *one* best type of wire rope for every application and the TIGER BRAND Wire Rope Specialist can help you select the *right* ropes for your particular needs. His job is to make sure that the rope is not overloaded. He checks the sheaves for proper size, wear and alignment. He instructs your operators on proper rope care and does a dozen other things to assure long service life at low unit cost for wire rope.

To help you maintain these operating standards, we have prepared a booklet entitled, "Valuable Facts about the use and care of Wire Rope." Every key man on your operating staff should be supplied with this much needed information.

SEND FOR FREE BOOKLET

American Steel & Wire Company
Rockefeller Building, Dept. E-6
Cleveland 13, Ohio

Gentlemen:

Please send me a copy of your booklet, "Valuable Facts about the use and care of Wire Rope."

Name.....

Company.....

Position.....

Address.....

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
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AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

• Winnetka residences form backdrop for ¾-yd. Bucyrus-Erie 22-B clamshell sinking a new shaft from which miners will work in two directions.

• Clamshell pauses to allow workmen armed with Gardner-Denver airspades to trim sides of embryo shaft for pre-fab liner plates.

Ninety Feet a Day Un

Fast, efficient removal of excavated material helps Paschen Contractors, Inc., Chicago, mine 90 and line 100 feet of 7-ft. tunnel a day on its $3 million North Shore intercepting sewer job for the Chicago Sanitary District.

FOR a year and a half now, lumbering work-a-day cranes, pavers and compressors have adorned one of the main thoroughfares connecting fashionable Evanston, Wilmette, Kenilworth and Winnetka suburbs just north of Chicago. The scene of this somewhat raucous but definitely beneficial activity is Green Bay Road which runs almost due north from Chicago a few miles inland from Lake Michigan.

On the east side of Green Bay Road lie the tracks of the Chicago and Northwestern Railroad whose fast commuter trains serve the area. The west side of the street is fronted by chic shops, and, as you drive farther north, by imposing homes. At any time, the wide artery bristles with the activity of busy residents.

These days, the bustle on Green Bay Road is increased by the presence of a wide variety of construction equipment belonging to Paschen Contractors, Inc., of Chicago. The hustle is not only on Green Bay Road, it is under the highway, too. In fact, most of the firm's work is being done about 30 feet below street level. For it is down there that Paschen is putting in the new and capacious North Shore intercepting sewer for the Chicago Sanitary District.

Long Range Benefits

As its name suggests, the new sewer is an auxiliary installation. It will relieve the burden on older, smaller sewers along its route. Several of these have already been joined to the new sewer. The real benefit, though, will be long range. In the years to come, the North Shore intercepting sewer will serve as a basis for extensive sewer improvements in its vicinity.

Young engineer Jack Paschen, who represents the company on this job, sums it up picturesquely when he says, "What they (the suburbs) need now is a lot of new sewers to connect into this one. Right now it's like buying a new suit and wearing the same old battered hat."

In this comparison, the "new suit" refers to the present project. And a roomy, durable "suit" it will be, too. The present side connections will not begin to tax its great capacity.

When work on Contract 7 is wound up this spring, the North Shore intercepting sewer will run beneath Green Bay Road from the drainage canal in Evanston north to Cherry Street in Winnetka—a distance of 19,000 feet. Plans call for its eventual extension still farther north.

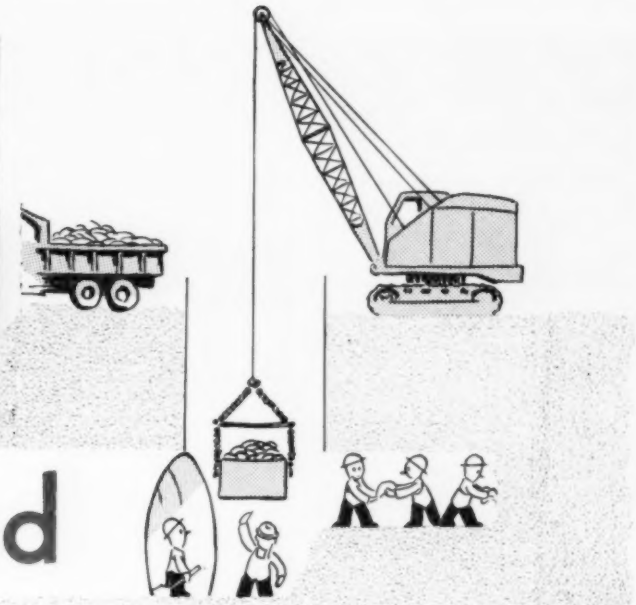
As it proceeds northward, the new conduit "telescopes" into smaller cross section dimensions. Thus far, the reduction in diameter has been accomplished in three stages. Starting at the drainage canal, the sewer measures 8 ft., 6⅝ in. wide by 9½ feet high. The sewer follows this dimension through the first 7,500 feet—all of Contract 6 which was the first contract let on the project. Immediately after this stretch, there follows 6,200 feet at the slightly smaller cross section, 7½ feet wide and 8 ft. 4 in. high. Finally the present working size of 6 ft. 4 in. width and 7 ft. 1 in. height is reached. This dimension will be maintained to the end of the present Contract 7—a length of 5,900 feet.

Has Dual Function

Bids on Contract 8 which provides for continuation of the sewer north from Cherry Street in Winnetka will be opened later this year. The present working dimension will be upheld well into Contract 8.

The North Shore intercepting sewer is a dual function conduit. It will

• Dirt from shaft excavation is stockpiled in road for periodic truck pickups. Compressor powering air spade work is a Chicago Pneumatic.



derground

serve as both sanitary and storm sewer. Besides connecting in with smaller sewers of both types, the new unit will serve a number of manholes on Green Bay Road.

An emergency outfall leads into the North Shore drainage canal in Evanston. It will be used only on the occasion of extra heavy loads on the sewer's capacity. Normally gates will divert sewage to the Chicago sewage treatment plant at Howard and McCormack Streets. Opening and closing of the gates will be telephone controlled from the Howard Street plant by literally dialing certain combinations to set the degree of opening.

The depth of the intercepting sewer —taken from street level to the crown —varies from 12 to 25 feet on the part of the job completed under Contract 6. Work done under Contract 7 averages 30 feet in depth.

So far, two contracts—6 and 7—have been let on the job—both to Paschen Contractors, Inc. Contract 6 was the initial agreement which the firm began in the fall of 1947. Most of the work on the first 1½ miles of sewer was completed when the firm's bid of approximately $2,990,000 for the 12,100 feet of sewer called for under Contract 7 was accepted a year later.

Contract 6 called for building the sewer from its outfall at the North Shore drainage canal in Evanston to Wilmette Avenue in Wilmette. On most of the job, the Paschen firm has used standard tunnel construction methods to good advantage. The firm has thorough background of experience in tunnel building, including a $4 million chunk of the Chicago subway to its credit. On the subway job, they were the only outfit to mine under the Chicago River.

At the outset in the fall of 1947, it was decided that underground mining methods similar to those used on the subway job would be most practical due to the heavy traffic on Green Bay Road, the softness of the subsoil, and other considerations.

Work Two Headings

Tunnel mining as practiced by the Chicago firm consists in (1) excavat-

• R. F. Kelly (left) and R. Girard (right), assistant chief engineer and chief designer respectively for the Chicago Sanitary District, inspect new opening with Paschen's superintendent, Mike Dilich. Here, 36 feet below intersection of Green Bay Road and Park Drive, two smaller sewers will be joined with the new intercepting sewer.

ing shafts from the street level, (2) lowering crews into two separated shafts, and (3) having these crews dig towards each other until they meet—and the segment of tunnel, or in this case sewer, is completed.

Because the underground clay on this part of the job was so soft it could be squeezed like modeling putty, compressed air was needed to keep back the walls of the tunnel. All underground mining on Contract 6 was, therefore, completed under compressed air.

Along the 1½-mile route of tunnel put down in the soft soil, only two shafts were opened to the street. They were kept at a bare minimum in order to reduce the number of air locks needed.

Six-ft., two-in., husky Mike Dilich, who is superintendent of the sewer job for the Paschen firm, says the ground mined under the terms of Contract 6 was the "worst I ever saw." He illustrates this statement by curling his hand together in a fist to show how easily the clay could be moulded.

Mike's word on the subject should be reliable; he's been mining for 43 years. His contemporaries on the job contend that "he's mined more tunnel than any living man."

• 1. Tunnel mining crew starts shaft heading on upper bench. Clay dogs are cut off, handed back and placed in railcar. 2. Crane drops sling into shaft where it is attached to loaded carbody. 3. Box of dogs is brought to street level and workman hooks crane's trip rope to bottom of homemade gondola. 4. Finally, crane dumps load of excavated clay into Doetsch Bros.' International dump truck.

Power Equipment Found Impractical

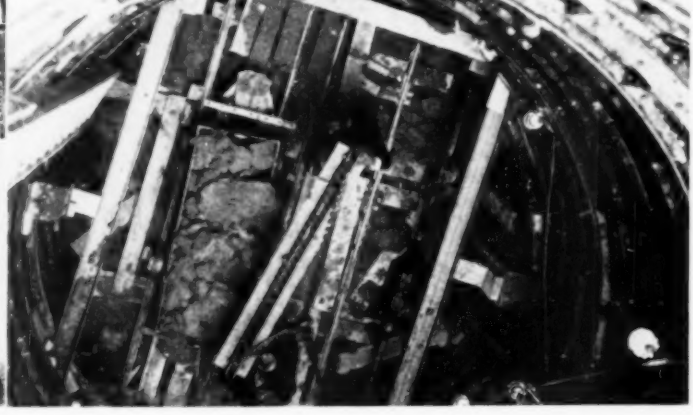
To excavate this muck, hand knives, air spades, and an occasional power knife were used. Most of the clay was cut out with the hand knives, however. The power knife took off too large a piece—"dog" in the tunnel worker's jargon. The big clump of sticky clay would not fall away from the face, and its own weight caused it to adhere right back on again. So the crude appearing, but in this case efficient, hand knives got the nod.

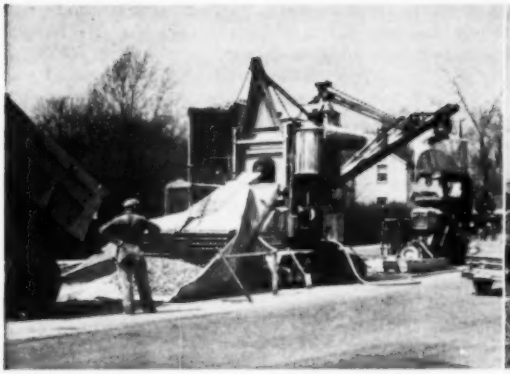
Four men wielded each knife, two pushing down on each side or handle. The dogs taken off in this fashion were small enough to fall away from the working face, yet large enough to get the work done efficiently.

Underground excavation of this type raises the problem of disposing of the spoil material. A happy combination of Paschen ingenuity and available subway building equipment provided the solution.

After each clay dog was removed, it was handed back to another man and loaded into a homemade sheet steel "gondola" of 1-cu. yd. capacity. These welded steel boxes were mounted on the same 24-gauge railway trucks that the Paschen firm employed for dirt removal on the Chicago subway job.

• Below: View into shaft from surface shows tunnel workers hitching sling to gondola for trip to surface. Box contains about one cu. yd. of muck.





• Above Left: Foote 34-E tilt-boom paver charges Pumpcrete which sends concrete underground to crew lining excavated portion of North Shore intercepting sewer. Heavy traffic along Green Bay Road caused long wait before unobstructed picture could be taken.

• Above Right: Pumpcrete hose goes underground to concreting crew via 1½-ft. drilled hole in street. Chicago Pneumatic compressor powers tunnel equipment at this location.

Since there were only two shafts on the section of sewer called for in the first contract, the haul distance proved to be rather long. To move these cars on the earlier job, the contractor pulled them 2,200 feet by cable to the nearest shaft opening. The cable-operated haul proved successful even around a curve in the tunnel.

When the miniature railway car reached the nearest shaft, the box was hoisted off the railway trucks by a crane which dropped its hook down into the shaft. Each box was lifted to the street level and dumped into waiting haul trucks.

Clay Condition Improved

When the project was visited, the contractor was well along with Contract 7 which was begun last Nov. 1. In making up his bid on this contract, the contractor took soil borings and bid on the type of clay sampled. It was discovered that as the excavation proceeded northward, the clay became firmer. This fact makes the later work slightly easier in several ways. For instance, compressed air is no longer needed to hold out the working face of the excavation.

Since concreting often follows excavation by as much as two weeks, a means of holding the form of the excavated sections must be employed. The Chicago contracting firm uses steel ribs and wooden lagging laid across the ribs to hold the shape of the tunnel during the interim period between excavation and concreting.

The steel ribs consist of four sections of 5-in. "I" beams. The ribs are taken underground in sections and bolted together as needed in the approximate shape of a horseshoe. The rounded part of the horseshoe becomes the crown of the tunnel while the legs form the sides. The ribs are set in

• Above, Center: Where tunnel changes to smaller size, wooden forms like these are used.

• Above: View through intercepting sewer before concrete forms are placed shows 24-gauge tracks, "I" beam ribs and 2-in. wood lagging.

• Far Left: At Park Drive intersection, Bucyrus-Erie 22-B clamshell transfers ready-mix from dump truck to Pumpcrete for sewer tie-in underground. Gardner-Denver compressor powers air equipment.

• Left: This Caterpillar-powered clamshell put down excavation for sewer connection in addition to feeding Pumpcrete.

the tunnel at 3-ft. intervals as the mining progresses.

Lagging boards — 2 x 6 and 2 x 8 planks—are driven between the wall of the excavation and the ribs. Thus the lagging prevents the earth walls from shifting and when the concrete is pumped into the tunnel, the lagging becomes the outside form and is, of course, lost in the process. Twenty-eight carloads of lumber—at 20,000 board feet apiece — have already become tunnel lagging

One of the contractor's incidental but persistent problems was obtaining storage space for this lumber as well as the ribs and other equipment needed on the job. In the populous North Shore area, vacant lots are as scarce as bulldozers at the opera. Jack Paschen, energetic young veteran of the construction business, spent a good deal of his time cornering the few lots available.

The inside of the sewer is shaped with Blaw-Knox tunnel forms. The forms are coupled together in 100-ft. sections and concreting proceeds at the rate of one section per day. Although mining goes on 'round-the-clock, concreting is done on the single-day shift only. Also two days are lost during each 2-week period in concreting tunnel invert. For these reasons, the mining crews are always well ahead of the concreting.

The invert or bottom part of the sewer is concreted first, and the concreting of the obvert follows approximately 1,000 feet behind. Cement is pumped underground with two Rex 160 Pumpcretes while two Foote 34-E tilt-boom pavers mix the concrete and pour it into the pumps.

Wood Forms at Size Changes

Where the sewer changes size, as it does beneath the intersection of Roger Avenue and Green Bay Road, a funnel-like form leading into the smaller section is constructed of wood. Throughout the length of the sewer reinforcing steel is used on specifications of Sanitary District engineers. Thickness of the concrete varies from 16 to 20 inches, well over the specified minimum.

A handy batch plant was available at the Evanston Fuel Co. which supplied mixture according to weights furnished by the Sanitary District. One bag of Utica went into each batch for the purpose of retarding the set.

Not a single day was lost in concreting during the winter although the mercury plunged to minus 20° F. one day. This satisfying performance was helped by the fact that the temperature in the tunnel usually stayed appreciably higher than that at street level.

Tacked to the wall of the Paschen field office on Green Bay Road is a multi-colored progress chart which indicates among other things, when the mining crews can expect to hole through. Viewing the headway made by his underground excavation crews, Jack Paschen shows his elation by the nature of his sole complaint.

"Our shaft-digging gang is having trouble keeping ahead of the underground mining details," he says.

Special Shaft Crew

The shaft digging crew that Paschen is referring to is the half dozen men who do nothing but dig shafts with a Bucyrus-Erie 22-B clamshell and airspades. Pavement is broken in an area corresponding to the diameter of the shaft; then the clamshell excavates the shaft. Several men with airspades trim the sides of the excavation so the shaft lining will fit snugly. Each shaft is reinforced with prefab corrugated steel liner plates bolted together.

After a shaft has been dug and braced, the mining crew goes down and turns the "eye." This tunnel-worker's phrase describes the process of starting the tunnel excavation at right angles to the vertical shaft.

While the crew in the new shaft is mining southward towards the com-

- Upper Left: Bucyrus-Erie 15-B crane lowers spillway casting into shaft where old sewer will tie into new one.
- Upper Right: The project's three top men pause on the steps of the Sanitary District field office in Winnetka. (Left to right) Chester Andree, Chicago Sanitary District senior engineer; Mike Dilich, superintendent of the job for the contractor; and Jack Paschen, civil engineer, Paschen Contractors, Inc.
- Left: Clamshell piles dirt removed from shaft in excavating for sewer connection.

pleted portion of the tunnel, another crew works northward out of the preceding shaft. In this way, two crews are always digging toward each other. So far, they have had no trouble holing through in line.

Underground mining as carried on by Paschen's men may be called a "bench" technique. One crew mines the top half of the tunnel while another follows directly behind and takes away the bottom half.

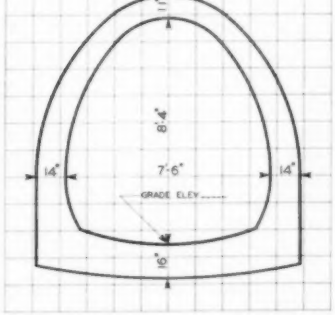
Use Incentive Plan

The Paschen mining crews are spurred on by an incentive plan. When any crew has made five "sets," it can knock off for the day. A "set" consists of the distance between two rib sections. Since they are spaced three feet apart, a total of 15 feet mined makes up one shift's work. Almost everyday, the crews finish their requirement before the 8-hour shift ends.

Underground excavation goes forward on a 3-shift schedule. Since two crews work each shift, making 15 feet apiece, the footage per shift is 30, while the daily progress is 90 feet.

Here again, the dogs are loaded to tunnel cars for transportation to the open shafts. Since the shafts are closer on the present part of the job, the 24-gauge railway cars with the homemade boxes are pushed by hand. Shafts are 800 feet apart, and therefore, at its longest haul point, the pushing distance amounts to only 400 feet.

As brought out before, the sheet steel gondolas which are mounted on rail trucks are a Paschen product. They measure approximately 5½ feet long, 2½ wide, and 2½ deep. They are quickly detachable in the shaft where they are hooked to the Bucyrus-Erie



• Line drawing of North Shore intercepting sewer cross section shows dimensions governing Contract 7, horseshoe shape and approximate thickness of concrete.

• Emergency outfall of new sewer will allow flash-flood flow into North Shore drainage canal in Evanston. Early part of the job here was an open-cut operation handled by this 1½-yd. Northwest 6 dragline.

cranes working on the surface. The boxes are equipped with chains secured at the bottom and connected to the crane's trip rope. Thus the operator can control both hoisting and dumping movements from his cab.

Crane Engines Run Constantly

Each box carries approximately one cu. yd. of the heavy clay which weighs about one ton per yard. Two Bucyrus-Erie 22-B cranes are employed and they work at high boom angles in order to leave ample space for auto traffic around the head of the shaft. Lifting, although it is not continuous, is steady enough so that the cranes cannot be shut down. They must, therefore, be kept running constantly during the 3-shift working day.

For every foot of mining progress, three cu. yd. of spoil material are taken out of the tunnel. Consequently, with 90 feet of excavation during the 3-shift working day, total of 270 yards of muck leaves the project every day.

To help the miners excavate in line, a crew of surveyors under Chester Andree, Sanitary District senior engineer, places a series of taut strings at 25-ft. intervals in the finished portion of the tunnel. These strings are positioned so they are exactly tangent to what will be the inside arch of the tunnel. By sighting along three of them, the mining boss can determine with precision the line of excavation to follow. Due to the accuracy of this procedure, mining has never been off more than one inch.

Another consequence of the slightly firmer clay encountered on this section of the sewer is the replacement of the hand knives with the faster-working Gardner-Denver airspades. Each mining crew is composed of approximately 19 men. Six men excavate the upper bench in the tunnel while another six take away the lower bench. Three pushers, two men at the foot of the shaft and two at the street level comprise the rest of the crew.

Hauling away of the muck at the surface has been subcontracted to Doetsch Bros. of Evanston.

Shafts Become Manholes

While mining goes on out of two shafts, the single shaftdigging crew is constantly at work putting down a third for the next leg of excavation. After a shaft has fulfilled its purpose as a working opening, it is backfilled to a diameter of three feet. In this way, all but four of the shafts along Contract 7 operations will become manholes draining Green Bay Road.

Mining under the present contract was wound up in May and final concreting is now going on.

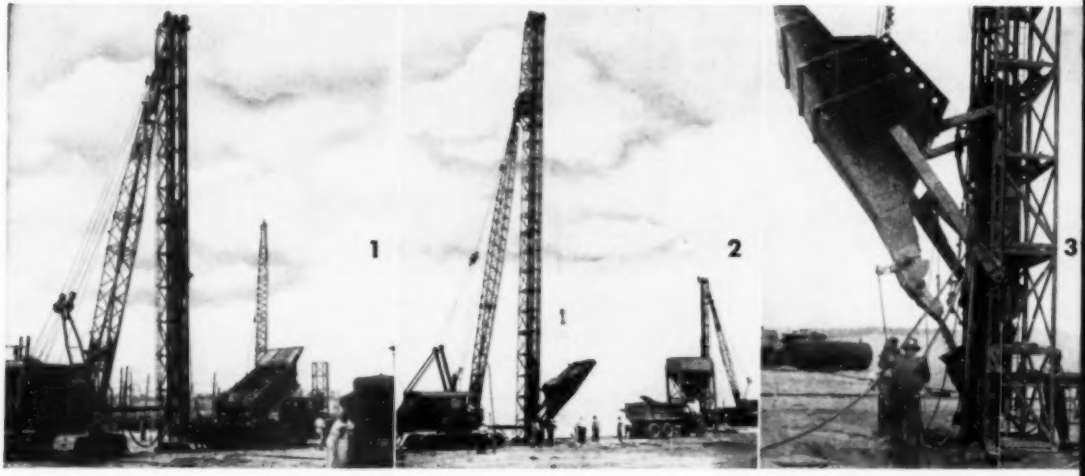
Three crews are kept busy spurring in connections from existing sewers. One of these crews uses a Bucyrus-Erie 22-B clamshell with concrete bucket; another works with a Bucyrus-Erie 15-B clamshell; and a third digs with a Northwest 6 equipped with a ⅝-yd. clamshell bucket.

Ninety-five per cent of the North Shore intercepting sewer runs close to previous power and sewer lines. For this reason, plotting of the sewer route had to be done with painstaking exactitude.

The outfall excavation at the south-

Continued on page 47

Sand-Draining Secaus



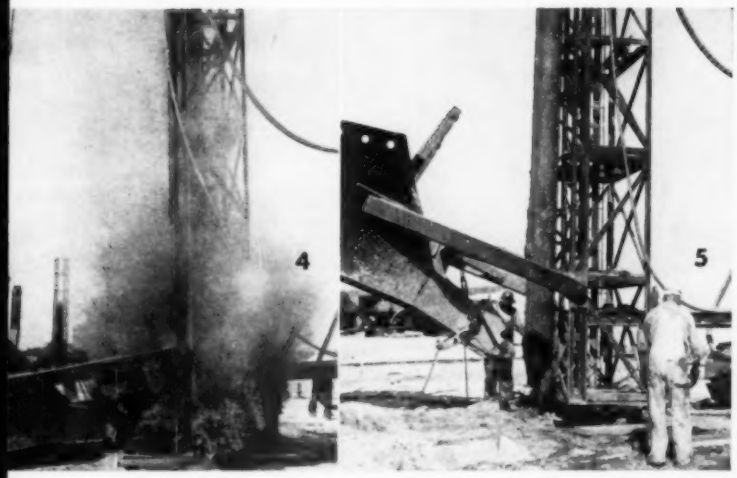
• 1. A 14-in. mandrel, 25 feet long, is driven through 7-ft. sand blanket, then through underlying muck to firm bottom. The double-acting hammer is a McKiernan-Terry 9 B-3 on 60-ft. leads handled by this Bucyrus-Erie 38-B crane. Mack truck dumps sand to skip. 2. In a similar operation (Manitowoc 3500 Speed-crane with 80-ft. boom, 115-ft. leads and McKiernan-Terry S-5 single-acting hammer has just driven a 91-ft. mandrel), sand is skip-dumped. 3. Close-up of mandrel-filling operation. Battery of two Ingersoll-Rand air compressors is in left rear. 4. Air blast helps crane pull out mandrel. 5. And mandrel comes free, leaving sand pile in place. Next, an overlying fill will be applied to hasten escape of water to surface.

Building a super highway over deep swamplands like New Jersey's Secauscus marshes would normally be a very expensive and time-consuming operation. Geo. M. Brewster & Son, Inc., Bogota, N. J., saved much excavation and settling time on its recent S-3 highway job by using the Porter method for under-drainage.

NEW JERSEY motorists will be 20 to 30 minutes closer to Times Square and the 34th Street business section of New York with completion this summer of the new S-3 bypass connecting Route 6 with Route 3 leading to the Lincoln Tunnel. Four lanes of dual highway divided by a grassed island will mean

• Left Above: Grading work for S-3 where it underpasses Route 17. At left is an approach ramp.
• Inset: With O. J. Porter (center), originator of the sand drain process, are Brewster officials, R. W. Moore (left), project manager, and E. S. Hoy, equipment manager.
• Left: Batter boards were installed on side slopes to retain top soil.

cus' Muck



greatly reduced travel time to commuters from Bergen, Passaic, Morris and Essex Counties, as well as to through travelers from the West. Geo. M. Brewster & Son, Inc., Bogota, N. J., have been awarded five contracts totalling $4,633,000 for construction of the 4.47-mile route.

Muck Up to 90 Feet Deep

One of the most interesting phases of Brewster's work has been the application of a new method for underdrainage in the Secauscus marshes. Underlying these marshlands are mud depths to 90 feet offering a formidable barrier of unstable foundation conditions. Previous to this job, the accepted method for constructing a satisfactory roadbed in this area was to remove the muck by excavation and replace with stable material.

Brewster utilized a method recently employed at La Guardia Field to halt sinking of runways and save the airport. This is the Porter sand drainage process, a technique for draining and settling the underlying muck in a brief time. Vertical sand pile drains are designed to cause water to escape from saturated material when an overlying fill or surcharge load is applied. Soft material is consolidated in place without causing the lateral displacement which would occur with loading alone.

The success of the sand drain method is explained by the theory of stabilization. The stabilization process varies as the square of the distance the water must travel through muck to escape. A 5-ft. layer of muck without sand drains will stabilize during the construction period of one year. A 50-ft. layer, untreated, will require 100 years, theoretically, to reach the same state of consolidation.

Settlement is Rapid

In deep layers of mud, vertical sand drains are installed on spacings which will provide drainage channels and drainage conditions comparable to that for thin layers. Fine materials, when laid down in water, usually segregate, resulting in greater permeability horizontally than in a vertical direction. Sand piles take full advantage of this phenomenon and with them it is possible to stabilize thick layers of compressible foundation materials in three months to a year, thus obtaining most of the settlement during the construction period.

In Brewster's application of the process, 14-in. mandrels, 25 and 91

Continued on page 48

• Right Above: Warner-Swasey Gradall spreads top soil on side slope of new highway.
• A 5-yd. Bucyrus-Erie 120-B shovel starts heavy cut. Due to nearness of homes, blasting was not feasible and big shovels were brought in to dig shale unblasted.

Lilliputi
Solve Fo

• Capable of hauling one or two trailers, this "Mule" is the truck of the U. S. Forest Service. Here it climbs Paulina Peak Trail in the Deschutes National Forest in central Oregon.

An army of miniature dozers, graders, ditchers and other pint-sized equipment developed by the U. S. Forest Service has been enlisted in a long-range war on that old enemy — fire. Powerful versions of "big brother" models, the small units are cutting and grading a network of 3-ft. forest trails.

By Tom Riley

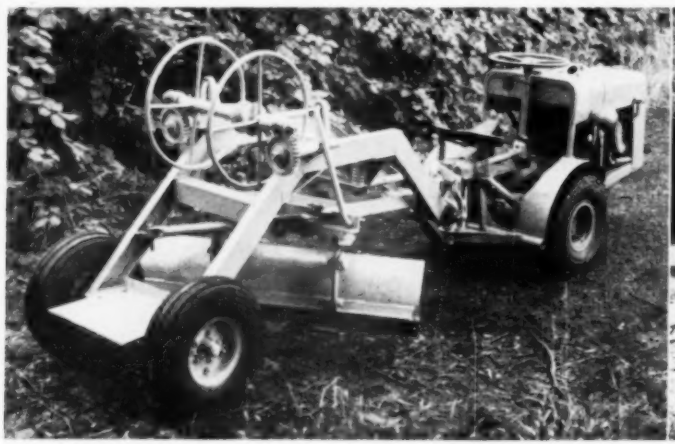
TO FIGHT today's increasing number of forest fires, the United States Forest Service is in need of networks of access roads throughout the western timberlands. Unable to build such roads as rapidly as needed because of the tremendous size and cost of the project, they have come up with a new answer. The Experimental Equipment Laboratory at Portland, Ore., has both designed and produced equipment to build the cheapest of roads—motorized trails.

The trails will have a 3-ft. roadbed. The complete line of miniature equipment for building them and for traveling on them—Lilliputian bulldozers, graders, air compressors, power saws, ditchers, pumps, trucks—has undergone severe tests and thorough usage in the fire season of 1948. Some of the equipment is of particular interest to contractors. Patented in the name of the commonwealth, it is available for manufacture or use by anyone.

Already the Western Gear Works of Seattle, Wash., is manufacturing the laboratory's Beetle, a genuine dozer that can be transported on a pickup truck. The Beetle is finding a place in jobs such as road maintenance and building excavations where the transportation of heavy tractors is not justified. It is a 15-hp miniature of an ordinary dozer with an extra feature of reversing without shifting gears, enabling it to make more passes per hour. It handles an 18x51-in. hydraulic-controlled blade and consumes only ¾ of a gallon of gasoline per hour. Its 1,650 pounds without dozer blade is half the weight of the Army's small airborne tractor, which was a pre-war invention of the Portland laboratory.

The trucks that the laboratory has produced for its motor trails are a clever hybrid between a car and a hauling wagon. Dubbed the Mule, each unit consists of a standard Crosley

• Below Left: Baby trail graders like this one—a miniature of a standard road grader—are towed by either the Mule (shown) or Beetle.
• Below Right: The spiral digger of this fire trencher cuts 2-ft. ditches, is unaffected by rocks. Moving the steering handle to either side changes the speed of the driving wheels.



an Rig
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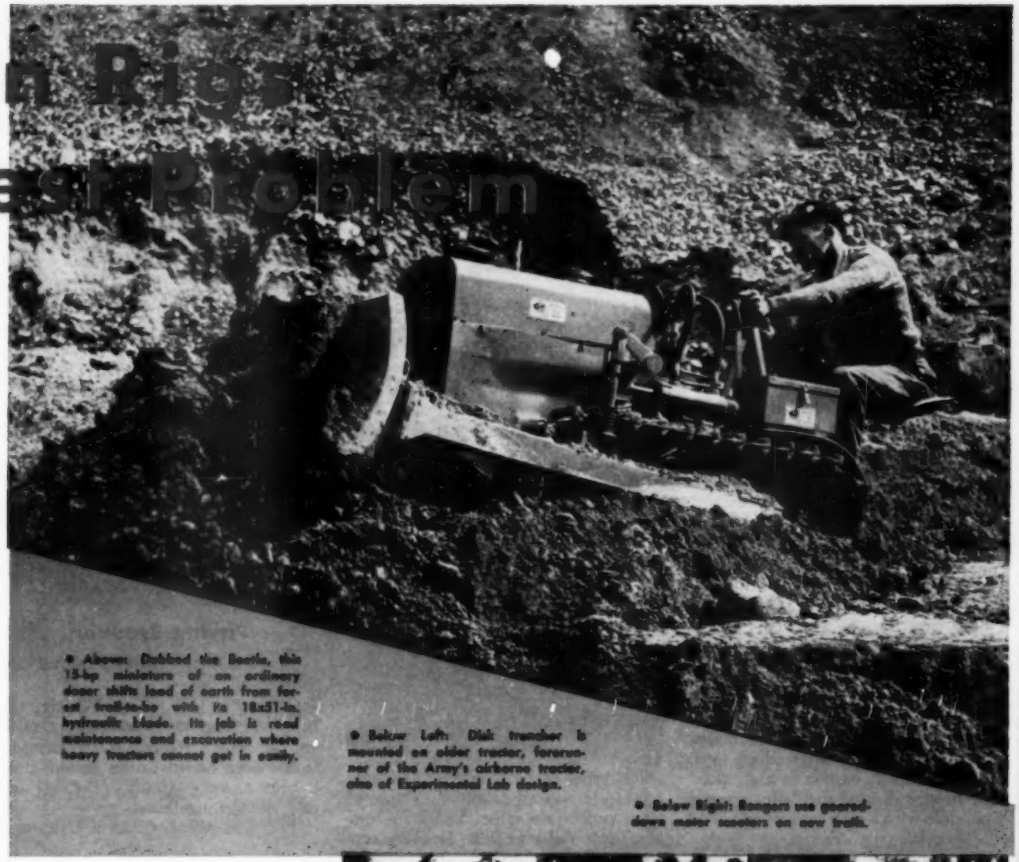

• Above: Dubbed the Beetle, this 15-hp miniature of an ordinary dozer shifts load of earth from forest trail-to-be with its 18x51-in. hydraulic blade. Its job is road maintenance and excavation where heavy tractors cannot get in easily.

• Below Left: Disk trencher is mounted on older tractor, forerunner of the Army's airborne tractor, also of Experimental Lab design.

• Below Right: Rangers use geared-down motor scooters on new trails.

auto engine and rear axle. A unit hauls one or two trailers, carrying up to 1,200 pounds, the equal of eight pack horses on the forest trails. Steering is unique. Due to the Mule's small size—36½-in. width—the experimental lab found that it could be easily steered by "wagging its tail." The geared-down steering wheel moves the trailer hitch on an arc to either side, thus turning the Mule. This eliminates the expense and complication of steering by braking the driving wheels. A Mule and its trailers can turn on a 5-ft. radius, can attain speeds up to 10 mph, and climb 20% slopes.

Pulled by either Mules or Beetles are the trail graders, miniatures of standard road graders. To power hand-held drills for cutting through rock,

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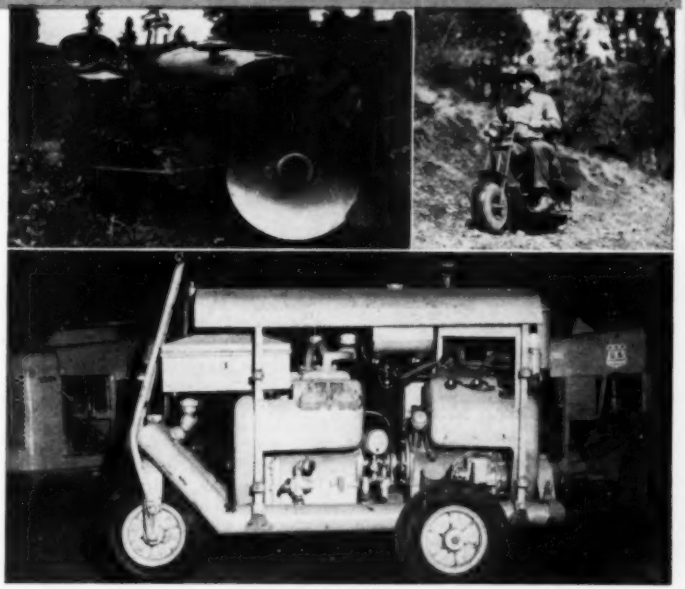


• Right: This compact air compressor uses standard pumps and motors, can be towed behind either a Mule or Beetle. Its tubular frame is the air tank.

Equipment You Ought to Know About

Motor Grader

Manufacturer: W. A. Riddell Corp., Bucyrus, Ohio.

Claims: The Warco 4D-100 extra heavy-duty motor grader is in the 100-hp class. Its advantages include full 360° revolving of the circle without

removing scarifier or teeth; hydraulic control; good blade reach, and full clearances under front axle and transmission.

Steel Depth-Hardener

Manufacturer: Wilson Carbon Co., Inc., 60 East 42nd St., New York 17, N. Y.

Claims: Hardening drills, chisels, gouges, caulkers, reamers, dies, taps, cutting tools, any carbon or high speed steel to any desired depth in minutes is possible with a new compound called Hi-Speed-It.

The process is simple. The object to be hardened is: (1) Heated in an ordinary plumber's torch or an open forge or furnace. (2) It is then dipped, rolled or stirred in the gray Hi-Speed-It powder. (3) 15 to 30 seconds are allowed for the powder to fuse and form a crust after which the object is again dipped lightly in or sprinkled with the compound. (4) The object is reheated. (5) It is quickly quenched in clean, cold water or brine. Depth of hardness is controlled by repeating the first four steps before quenching. High speed steels are processed similarly, but at higher temperatures and are quenched in oil.

Hi-Speed-It contains no cyanide or other producers of toxic fumes.

Air Cranking Motor

Manufacturer: Leece-Neville Co., Cleveland, Ohio.

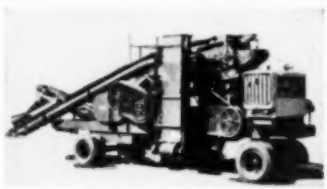
Claims: A new air cranking motor is designed for low-cost starting of diesel and gasoline engines. It weighs 43 pounds, occupies no more space than an electric starter and can be installed with the same three bolts used for mounting the latter. One motor may crank engines up to 1,000-cu. in. displacement under normal conditions. Two motors may be used for larger engines.

It is adaptable in road building and heavy construction where sufficient compressed air is nearly always available on the job and where gasoline or electric starters are extra equipment.

Portable Screening Plant

Manufacturer: Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis, Minn.

Claims: The 17-V, a new small gravel crushing and screening plant has a



swivel-type feeder conveyor, features 12 ft. 6 in. overall height. All drives on plant proper are either V-belt or tumbler shaft and gear box. Delivery conveyor folds at the side.

Jaw crusher is 10x16 and the roll crusher 24x16. A 30-in., 8-ft. 3½ deck vibrator screen provides 40 square feet of effective screening area. The chassis is 2-axle with four 9.00x20 tires front and rear.

It is recommended for small construction jobs, maintenance and county work.

AC Arc Welders

Manufacturer: General Electric, Schenectady, N. Y.

Claims: A new line of AC arc welders, featuring increased welding range and stepless precision current control is available in 200-, 300-, 400-, and 500-amp models for indoor manual welding; 750- and 1,000-amp models for machine and submerged melt welding; and a special 200-amp model for light-duty, job-shop welding. The 300-, 400-, and 500-amp models are offered also in weather-resistant enclosures with Idlematic control for both indoor and outdoor operation.

Dual current ranges and increased adjustment overtravel on the machines provide extra low current range with high maximum short-time output. They are designed with stepless current control, operated by a bearing-mounted current-adjustment crank which enables the operator to make precision settings throughout the current range.

The welders have an open-circuit voltage of 75 volts, providing good welding performance through added arc stability. Idlematic controls on the weather-resistant models automatically reduce the open circuit voltage on the electrode to about 30 volts; but when the arc is struck, the advantage of 75-volt open circuit voltage is retained.

Protection for the welders is provided by the steel housings. Cool operation is attained through the use of up-draft, fan-assisted ventilation.

Paving Breaker

Manufacturer: Gardner-Denver Co., Quincy, Ill.

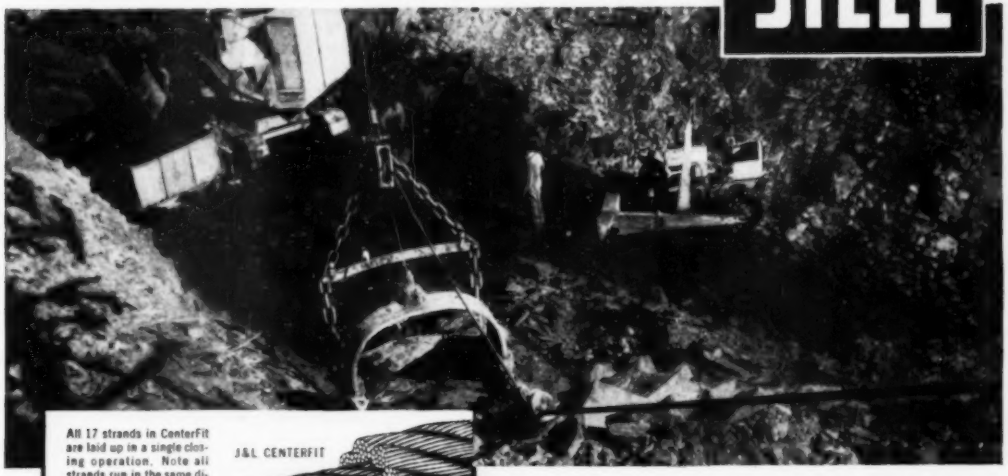
Claims: A new paving breaker, the B37 weighing 38 pounds is intended for use where footing is treacherous. It has been added to the manufacturer's line as a companion to the B67 and B87 heavier machines.

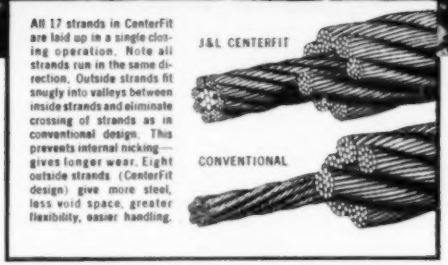
The B37 breaker has a renewable

chuck liner replaceable at low cost. A hammer of the block-type pistol type is reversible for longer life. The use of a tappet minimizes wear on the ham-

GILLESPIE COAL COMPANY gets 30% Longer Service with J&L CenterFit Wire Rope

J&L STEEL




All 17 strands in CenterFit are laid up in a single closing operation. Note all strands run in the same direction. Outside strands fit snugly into valleys between inside strands and eliminate crossing of strands as in conventional design. This prevents internal nicking—gives longer wear. Eight outside strands (CenterFit design) give more steel, less void space, greater flexibility, easier handling.
J&L CENTERFIT
CONVENTIONAL

J&L CenterFit drag cable as seen from the fairlead sheave of a Marion 40-A dragline. The 3-yd. bucket is removing overburden from coal seam.

The "right wire rope for the job" pays off in longer service, reduced maintenance and greater profits.

A 30% average increase in service life! That's the performance record reported by Gillespie Coal Company when J&L CenterFit wire rope replaced a conventional dragline cable on a Marion 40-A dragline equipped with a 3-yd. bucket at its Lyons, Ind., open pit coal mine.

Average life of a conventional 6x19 dragline was 12 to 15 days; with CenterFit it was 17 to 22 days!

J&L CenterFit wire rope was selected for this application as a result of a careful analysis of operating conditions at the Lyons mine by Mr. L. S. Shaffer, J&L wire rope distributor in Brazil, Indiana. He knew the CenterFit design—exclusive with J&L—would provide the greater flexibility required for long service life on the small diameter sheaves and drums of this dragline. Actual performance records *proved* that CenterFit was *the right rope for this particular job.*

Perhaps you, too, can use J&L CenterFit wire rope to advantage. In many places it gives improved performance and longer service.

We have just issued a new handbook, "*Wire Rope Is a Machine.*" This 96-page illustrated, pocket-size book is written *for the man on the job.* Tells how to select the correct wire rope . . . How to install, operate and maintain wire rope for maximum service. If you use wire rope, we'll gladly send you a copy. The coupon is for your convenience.

Jones & Laughlin Steel Corporation
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Please send me a free copy of your new handbook, "Wire Rope Is a Machine."

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JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY (*hi-tensile steels*).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

mer striking face, and the tappet operates in a renewable bushing.

Another feature of the B37 is the throttle valve lock, which works like the "safety" on a gun. A low-lift plate valve assures low air consumption, while the long piston stroke provides a hard-hitting blow. The manufacturer states that the exhaust will not freeze.

Additional features are the latch-type steel retainer which holds the tool securely and an integral oil reservoir which meters oil to every working part, including the tool shank.

Portable Hoist

Manufacturer: Lincoln Precision Machining Co., North Grafton, Mass.

Claims: The Lug-All, a portable hoist weighing only 8½ pounds, is capable of lifting 1½ tons. Of alloy aluminum, the hoist can be operated by a single worker.

Designed with a minimum of parts,

the Lug-All can be repaired on the job with a wrench and/or a screw driver, eliminating the need for returning the hoist to the factory for repairs.

The handle may be reversed for easy operating conditions in tight places.

Lug-All construction employs a 133-strand aircraft cable which reels out without snagging. Limit for the cable is 15 feet, at which length the hoist capacity is 1,500 pounds. When doubled (length—7½ feet) its capacity is increased to 1½ tons. Price is $29.50.

Tandem Axle Rear Dump

Manufacturer: Euclid Road Machinery Co., Cleveland, Ohio.

Claims: The FFD tandem-axle rear-dump truck is powered by two diesel engines, mounted side by side—of 190 hp each, for a total of 380 hp. Each

engine drives one of the rear axles through a torque converter and torqmatic transmission, thus eliminating the conventional inter-axle power divider. There is no clutch pedal or manual shifting of gears. The operator can change to the proper gear under full power at any travel speed. Top speed with full 68,000-lb. payload is 25.4 mph. Total braking surface is 1,620 square inches.

Two planetary drive axles, with reductions at each wheel are mounted on free floating springs. Steering brakes on the drive wheels permit short turns. Payload capacity is 20 cu. yd. struck and 34 short tons.

Wire Rope Sling

Manufacturer: American Chain & Cable Co., Inc., Wilkes-Barre, Pa.

Claims: A new addition to the line of ACCO registered wire rope slings is the SW-42 cable-laid grommet with double ACCO-LOC splices. Made entirely of preformed improved plow steel wires, the cable-laid grommet gives flexibility comparable to manila rope and freedom from crankiness. It can be used in the same types of hitches as manila rope. The strength of the all-steel construction permits use of smaller diameters than would be necessary with fibre ropes and provides a high safety factor of 5 to 1.

The grommet is furnished in diameters from 8/32-in. to 1½-in. with rated capacities up to 53 tons in basket hitch.

Trench Jack

Manufacturer: Acrow, Inc., 420 Lexington Ave., New York, N. Y.

Claims: An adjustable steel trench jack, designed primarily for lateral strutting in trench excavations, eliminates the cutting of lumber, with the result necessity of wedging and nailing. Adjustment of the jack is positive and accurate—its adjustment feature, which is a screwing action, consists of a nut located over a square-cut thread, cut four threads to the inch which activates a pin passed through the slot in the outer section and through closely spaced holes in the inner section. It has no loose parts and can be positioned by one man.

The jack is manufactured in three sizes which cover a range of adjustment from 1 ft., 6 in. to 5 ft., 6 in.

Electrode Container

Manufacturer: Alloy Rods Co., York, Pa.

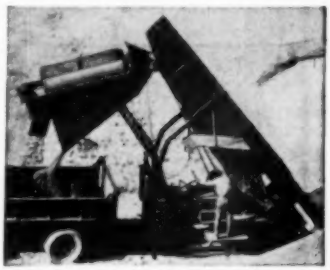
Claims: An all-steel, moisture-proof and grease-proof electrode container simplifies stock problems and eliminates moisture damage to electrodes. It comes in 5- and 10-lb. sizes, designed to hold the right amount of electrodes for typical welding jobs. Electrodes left in the container after the welder has finished an immediate job are kept moisture free when the self-locking top is replaced.

Rotary Screen Loader

Manufacturer: N. P. Nelson, Iron Works, Clifton, N. J.

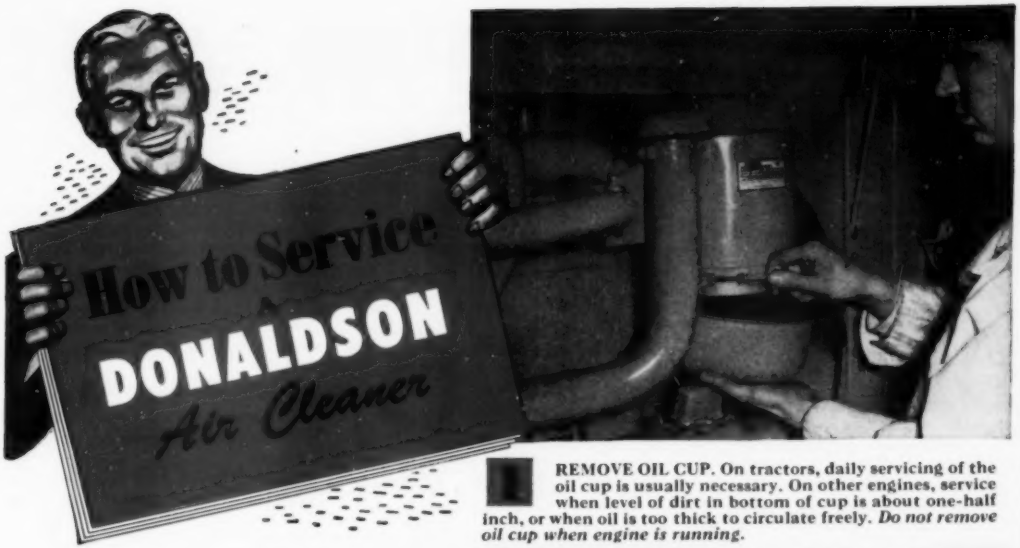
Claims: A new automatic rotary screen loader that separates sand and gravel as it digs and loads into trucks, features one-man operation. The unit consists of a rotary screen mounted on a self-powered Nelson Q-10 heavy-duty bucket loader.

The rotary screen is constructed of steel plate channel framing and abrasion resisting wire mesh screen. In operation, the screen is synchronized



with the bucket conveyor of the loader. Two chutes at right angles direct the flow of separated materials. While digging and loading materials that do not require screening, a throw-out clutch enables the operator to disengage the screen and deflect material through the lower chute. The rotary screen will also handle damp and clinging sand. Screening capacity of dry mixtures ranges from one to two cu. yd. a minute, depending on the size of the screen openings and the mixture of the material.

The Q-10 bucket loader, on which the rotary screen is mounted is engi-



REMOVE OIL CUP. On tractors, daily servicing of the oil cup is usually necessary. On other engines, service when level of dirt in bottom of cup is about one-half inch, or when oil is too thick to circulate freely. *Do not remove oil cup when engine is running.*

Air cleaners protect the performance and prolong the life of engines by keeping abrasive dust and dirt from moving parts. Without this protection engines would quickly wear out.

However, regular, careful servicing of the air cleaner is essential to keep it operating properly. Your tractor or other power machinery will run better . . . longer . . . will cost you far less for maintenance, if you give air cleaners the right care.

Ordinarily, only the five steps outlined here are required. They take little time, but they return generous dividends.

CLEAN OUT SLUDGE. Pour out old oil and wipe out cup. Refill with fresh oil up to oil level bead, no higher. Use oil no heavier than that used in crankcase.

CHECK LOWER SCREEN. Ordinarily, little attention is required here, but it is good practice to inspect screen and remove any leaves, chaff or straw.

REMOVE AND WASH. Some Donaldson Air Cleaners have a removable lower section. If dirty, remove and wash in gasoline. Then dry.

CLEAN CENTER TUBE. Inspect center tube several times a season for dirt accumulation. Remove by ramming cloth through tube.

NOTE: Once a season, remove entire air cleaner element and wash in gasoline or kerosene. Check hose and hose clamp connections periodically. Air cleaner efficiency is directly dependent upon air tight connections

Donaldson Oil-Washed Air Cleaners are Standard equipment on more heavy-duty engines than are all other makes of air cleaners combined.

DONALDSON CO. INC.
666 PELHAM BLVD. ST. PAUL 4, MINN.

DONALDSON COMPANY (CANADA) LTD.—Chatham, Ontario

DONALDSON
Oil-Washed
AIR CLEANERS

neered to dislodge the material and spiral it into the buckets. This feeder eliminates extra manpower for shovelling and for loosening the bank.

Screen size is 3 ft., 4 in. in diameter and 4 ft., 10 in. in length. Standard screen opening sizes are ½, ¾ and one inch square with special size openings and construction on application. The weight of the screen assembly is approximately 1,800 pounds and the loader on which it is mounted weighs approximately 14,500 pounds.

Welding Kit

Manufacturer: All State Welding Alloys Co., Inc., 273 Ferris Ave., White Plains, N. Y.

Claims: A compact welding kit—the All-State Doc Alloys Kit—contains low-temperature alloys and fluxes for any gas welding job. A relatively small metal box (2x4½x20½-in.) holds an ample supply of silver solder and 10 other different kinds of low-temperature gas welding rods, a low-temperature galvanizing powder, and eight fluxes. The rods are individually color marked and in labeled pockets in a leatherette roll; flux jars have individual labels; a booklet of complete instructions is included; and the cover of the box contains a convenient chart of the contents with practical working directions.

Mobile Concrete Mixer

Manufacturers: Mixermobile Manufacturers, Portland, Ore.

Claims: The 1-yd. Mixermobile is a complete mobile concrete mixing and elevating plant. It has a hydraulically-operated self-loading skip for receiving batched aggregates directly from dump trucks, portable batching plants, or front-end loaders. The unit has a standard 35-ft. steel tower, with 10-ft. extensions available.

Although designed for 1-cu. yd. batches, the mixing drum allows for overage. From the mixing drum the mixture is transferred by a dumping "spoon" into the elevating bucket, then hoisted and poured into the storage hopper. When the drum is revolving, the mixture can be visually inspected through either front or rear openings of the drum. The M-6 can be used with ready-mix.

Power is furnished by the truck motor, an 8-cylinder Ford industrial engine. A takeoff unit transmits the truck motor power for loading the drum, mixing and hoisting.

"Get a hold on yourself, Fred! That's the 15th one you've dropped today."

Air Hammer

Manufacturer: Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Claims: The medium-weight J-40 Jackhamer is similar in design to the heavier J-50 model. A double-kicker port valve made of wear-resistant material permits full air pressure on the piston. A specially-designed auxiliary port allows full-line air pressure to pass through the drill steel when the blower valve is opened. The design of the throttle valve and the air-supply port permits the gradual admittance of air into the cylinder.

The chuck driver is fitted with a replaceable bronze chuck nut which protects the piston flutes from checks and scoring in case a drill is allowed to run dry of lubrication. A renewable bronze bushing in the piston-stem bearing takes the wear from the piston-stem and prevents scoring.

A three-in-one backhead enables the machine to be adjusted for wet, dry or blower-type drilling. The J-40 Jackhamer is especially suited for use with Carset Jackbits (set with tungsten carbide inserts).

Excavators

Manufacturer: Osgood Co., Marion, Ohio.

Claims: The newly-designed Type 72 of the 1¼-yd. excavator and materials handling machine is available in three models: the 720, a shovel, dragline, clamshell, crane or hoe, with all front end attachments interchangeable; the 725 Mobilcrane, and the 727 dragline, clamshell or crane.

The Type 72 has a new crawler unit design with each tread belt independently controlled and the manufacturer's new hook rollers. Heavy brackets supporting the rollers are mounted at each corner of the deck. Further stabilization of the superstructure on the crawlers is through a gudgeon which is part of the crawler base casting.

"Air-cushion" clutches apply metered air pressure to the working parts. A rotary coupling takes air pressure down through the vertical travel shaft to the steering clutches and brakes without twisting or straining air pipes.

The Mobilcrane 725 is a 1-man operated, 1-engine machine, mounted on a rubber-tired, wheel-mounted chassis. Independent travel unit provides one or two speeds forward and reverse as required.

The 727 includes special features for levee and other dragline work as well as clamshell and crane service.

Ignition System Seal

National Distributor: Silver Booster Mfg. Co., 812 S. Flower St., Burbank, Calif.

Claims: Safe-T-Seal is a noninflammable, semi-liquid product that is applied to spark plugs, coils, distributors, magnetos, battery posts and cables, and all wiring in the ignition system. It seals the electric current within the ignition system, thus improving spark strength and constant firing. Dampness, cold, rain, snow or even a steady stream of water does not affect the function of an ignition system processed with the product.

Among the benefits claimed are quicker starting, increased gasoline efficiency and less dilution of crankcase oil. It is recommended for owners of trucks, tractors, trailers and stationery engines.

Shutoff Valve

Manufacturer: Olin Gas Engine Co., 9 Lafayette Ave., Buffalo 13, N. Y.

Claims: An automatic safety shutoff valve is made for use on compressed air lines. Designed to fit standard connections, it is inserted at the intake end of the air hose. When a break occurs in the hose, the valve closes instantly and shuts off the pressure, permitting only a light stream of air to escape through a by-pass. This prevents danger of accidents caused when a hose, under pressure, breaks and gets out of control.

After a break in the hose is repaired, the pressure will equalize on both sides of the valve, and a spring opens it automatically permitting air pressure to resume. Tools can also be changed without shutting off a valve at the air line.

The valve does not restrict the flow or reduce the volume of air being used and will operate under varying pressures. It can also be used for gases, steam and light liquids flowing under pressure, as well as air.

Ideas on the Job

How to Check Engine Flywheel for Trueness

Although many mechanics are familiar with methods for checking trueness of flywheels and flywheel housings of internal combustion engines, the most efficient procedure and maximum allowable tolerances are not generally known. Here's a good step-by-step procedure:

1. Clean flywheel and housing thoroughly.
2. Bolt thousandths indicator or gauge

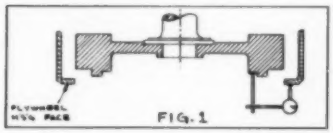


FIG. 1

to flywheel so it is perpendicular to the housing face, and indicator stem is riding on the flywheel housing face (figure 1).

3. The maximum deviation of the face of the flywheel housing flange from its true position when the flywheel is rotated on its axis should be .005 in. (Total indicator runout .010 in.)
4. Then readjust indicator so that the stem will ride on the bore of the

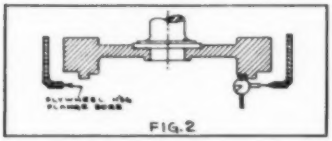


FIG. 2

flywheel housing flange (figure 2).

5. Eccentricity of the bore of the flywheel housing should be no more than .005 in. (total indicator reading .010 in.).
6. Remove indicator bracket from flywheel and bolt indicator to flywheel housing and check flywheel runout.
7. Variation of the surface to which the driving ring or clutch plate is

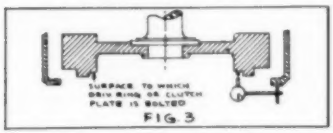


FIG. 3

bolted should be no more than 0.0025 in. (total indicator runout .005 in., figure 3).

8. The maximum eccentricity for the pilot in the flywheel which pilots the driving ring or clutch plate

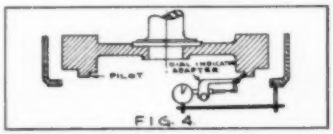


FIG. 4

shall be .0025 in. (total indicator runout .005 in., figure 4).

9. With indicator bolted to the flywheel housing, check eccentricity of pilot bearing bore in the flywheel. Eccentricity of the bore in the flywheel for the pilot bearing should be no more than .0015 in.

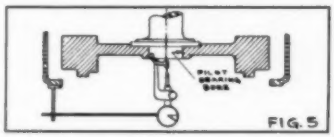


FIG. 5

(total indicator runout .003 in. figure 5).

—George Pheil

Drilling Hard Rock

When a dull drill is removed from a hole, the bottom of the hole is the shape of the drill in reverse. A new drill will not fit the hole at once causing nearly all the shock to fall upon the outer corners of the bit, often breaking it. If the new drill is struck lightly for a few minutes, it will cut a seat for itself preventing breakage.

—Vollie Tripp

• When antennae mounted on the rear of this Allis-Chalmers HD-19 crawler contact electrodes, they automatically control the gate on a coal hopper at the Cincinnati Gas and Light Co. yards. After a light in the HD-19's cab signals contact, the operator can control the gate without leaving the tractor. Loading time is 10 to 12 seconds. Tractor-scraper units, such as these, dump their loads in storage areas, spread coal in thin layers and compact it with their own weight. This action eliminates voids which cause fires due to spontaneous combustion.

Portable Cross Bridges

In constructing a 24-in. all-welded gas main, 7½ miles long, near Mount Vernon, N. Y., the Slattery Construction Co. designed and fabricated several portable steel bridges to carry traffic wherever the line crosses an intersection. The pipe was laid in a 4-ft. trench that runs all the way along city streets, the trench crossing a street about every 100 yards.

Usually, a wooden bridge is constructed of heavy planks; if the trench is very wide, the bridge is reinforced with braces from the bottom of the trench. Such a bridge requires extra time and work to build, must be torn down when moved. Slattery dispensed with this laborious process by designing simple, portable bridges.

The bridge used for foot traffic consists of a large sheet of 1-in. mild steel plate with several holes at the edges for lifting with sling and hooks.

The vehicle bridges are fabricated from 6- to 8-ft. lengths of 6-in. "I" beams beveled at the ends and welded to three plates of ½-in. steel. The bevel provides a narrow face to the wheel of an oncoming car or truck. The three steel plates are used to eliminate bending—one piece on the flat and two narrow pieces for the beveled edges. Holes are provided at the edges for easy lifting by a crane.

Such a steel bridge has several advantages over its wooden fellow. It can be placed in position and forgotten. It will carry any load the road leading to it will. Because it won't shift or

Continued on page 47

RAM

Land clearing—or any 'dozer work—is a pushover for International Diesel Crawlers. International diesels have the power and stamina to ram jobs through to completion at low cost and in minimum time.

International Power, geared to the ground by earth-grabbing tracks, puts maximum pull or push into the work for efficient earthmoving.

Get these International diesel advantages: advanced design fuel combustion, simplified fuel injection, positive all-weather starting, sensitive speed governing with torque control that increases engine torque as much as 15% when the load demands it, and the many other operating and construction features which International crawlers provide. They assure *superior performance, matchless operating economy* and *low maintenance;* benefits which spell PROFITS for International owners everywhere.

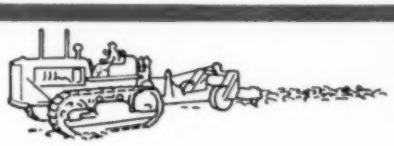
See *your* International Industrial Power Distributor or write for folder describing the International TD-18 Diesel Crawler.

INTERNATIONAL HARVESTER COMPANY · Chicago

Listen to James Melton and "Harvest of Stars" every Sunday, NBC.

Standardize on Power that Pays

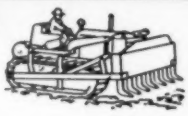
CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

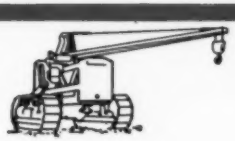


The International TD-18 Diesel Crawler, below, with matched bulldozer, clears stumps from land for a Seattle suburb. Its owner, W. H. Kamp of Des Moines, Washington, has worked this tractor for 4½ years without any trouble or repairs. It puts in seven day weeks of 24-hour days at long stretches. It has built as much as 7,000 feet of streets in twenty days, including opening and clearing land during extremely wet conditions, removing rocks as large as five tons and stumps of 10-ft. diameter. "The tractor is just as true today as a new machine," he says, "not sprung in the least and has never been off the tracks!" Quite a record for more than 10,000 hours of operation!

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER





News from the Field

PRA Index Drops

For the first time since 1940 the quarterly index of highway construction cost, compiled by the PRA, has shown a decline in contract prices. The index, prepared for the first three months of this year and based on 1940 prices, dropped from 223.5% of the 1940 average to 219.2%.

Diamond Driller Wins $1,000 for Multiple Packer

The first Department of Interior $1,000 cash award for Federal employees developing new equipment or methods went to E. D. "Dusty" Rhoades, drilling superintendent on the Columbia Basin project in eastern Washington. Rhoades merited the award for his "multiple packer," a device which has reduced the number of diamond drill holes necessary for obtaining vital information on ground-water levels throughout the project.

Much of the exploratory drilling in the Basin project has been aimed at determining the action of subsurface water flow. In connection with the construction of the South Dam near Coulee City, it was found that several water tables existed in the various strata of basalt forming the foundation for the dam. Elevation of these different tables had to be determined in a large number of places. It was also necessary that a running record be kept of these data over a period commencing prior to the construction of the dam and continuing for several years after its completion and filling of the reservoir.

While he was engaged in this work, Rhoades devised the multiple packer. As the first step in obtaining ground-water information, a diamond drill hole is driven through earth and rock to intercept all the water tables for which measurements are needed. Ordinarily, only two tables can be measured by a single hole. Thus, if six water flows are encountered, a total of at least three drill holes are required. By using the multiple packer, only a single drill hole is needed. The device permits determination of the ground-water levels at the various points where the flows intersect the hole. As many as six flows have been measured from a single hole, but many more can be gauged by making the initial hole larger.

The saving to government in this one project through the use of the packer has run to hundreds of thousands of dollars.

Rhoades has spent the past 12 years supervising exploratory drilling on the Columbia Basin project. Since then he has directed foundation drilling for four earth-and-rock dams in the project and for the several canals and siphons under construction throughout the program. The diamond driller estimates that he has directed the completion of more than 500,000 feet of drill holes. He has worked with diamond drilling equipment in mineralized areas of Oregon, Washington and British Columbia. He has also worked in Alaska's gold fields.

Fill Swamp To Make New Tacoma Industrial Area

In about 30 days, a swampy, brush-covered area on the outskirts of Tacoma, Wash., was turned into a site suitable for new buildings planned by the Tacoma City Light Co. Harrison Bros., Tacoma contracting firm, carried out the 30,000-cu. yd. excavating and fill-in job on the 500 x 700 property, bordering high tension power lines coming from the Cushman hydro-electric power plant. Cost of the project was $8,000.

The new buildings will house electrical installations for tapping the power lines and supplying the growing south end of the city with more electrical facilities.

Clearing and drainage operations went ahead simultaneously. Two tractors—an Allis-Chalmers HD-7 with an Isaacson dozer, and a Caterpillar HD-6 with dozer—cleared brush from the area. At the same time a 3 x 3¼ Wisconsin AEH pump drained the swampy depressions of water.

Following clearing operations, a 1-yd. Bucyrus-Erie 29-B shovel loaded borrow from elevated ground on the back of the property. Three 4-yd. Ford dump trucks equipped with U. S. Royal tires hauled the dirt in short, quick trips and dumped it in even windrows over the depression area which had been drained. The trucks averaged 160 loads per 8-hour day, sometimes reaching 180 trips a day.

The two tractors then leveled and compacted the windrows of soft earth

• Far left: Borrow is loaded by a 1-yd. Bucyrus-Erie 29-B to 4-yd. Ford dump truck. Dirt was used for fill on the swampy part of a job recently completed by Harrison Bros., Tacoma, Wash.
• Left: Here the Ford dumps its load while an Allis-Chalmers HD-7 with an Isaacson dozer levels a windrow left by a previous truck.
• Below: Overall view of the site shows fill method employed. Note the short haul from shovel to fill area.

• A ¾-yd. clamshell bucket on a Bucyrus-Erie H-3 Hydrocrane scoops soil from a drainage ditch being put down alongside a Long Island Railroad track at Roslyn, Long Island. The rig's owner is H. A. Funfgeld, Hicksville, Long Island.

fill until it attained a solid depth of nine feet. Occasionally, a tractor pulled a 10-yd. Firestone-tired Wooldridge scraper to spread the fill evenly.

E. C. Rogers, Harrison superintendent, was in charge of operations.

41 Million Vehicles Registered in 1948

More than three million private and commercial vehicles were added to the flood of traffic on the nation's highways in 1948, according to final reports received by the PRA, Federal Works Agency, from state authorities. A grand total of 41,151,326 privately, commercially and publicly owned vehicles were registered in 1948, compared with a total of 37,841,498 in 1947.

Reports showed that 40,622,264 privately owned automobiles and commercial vehicles and 529,062 publicly owned vehicles were registered. Privately owned and commercial vehicle registration was 8.7% above the 1947 total. The number of trucks was up 11%.

Seventeen states reported an increase of 10% or more in private and commercial vehicle registrations. Highest percentage increases were reported by West Virginia, Idaho, Arizona, Wyoming and South Dakota in that order. The three states having the largest total registrations were California, New York and Pennsylvania.

Motor vehicle travel on rural roads and city streets throughout the country was higher during the past year than in any previous year, and the upward trend continued during the first two months of the year. PRA reported an estimated total of 14,788 million miles of travel on rural roads in February, the latest month for which figures were available. This was an increase of 11.2% over last year's volume of travel in the same month. Travel on city streets for February was up 6.1% over February, 1948.

Steel Erection Begins At United Nations Site

Steel erection for the Secretariat building at the UN site in Manhattan began in April. Fuller-Turner Walsh-Slattery, Inc., composite building group under contract with the UN to construct the first units of the world capital, will use more than 13,000 tons of steel in this building. It will rise 42 floors above Franklin D. Roosevelt Drive, including a basement of three levels. Erection of structural steel is expected to be completed by September.

Because of the narrowness of the building some of the largest wind-bracing connections ever developed will be used to fortify the steel framework. These connections will be much heavier than for the average 42-floor building. As the steel goes up, the pouring of the concrete floor slabs will follow closely behind.

The steel is being delivered by rail from a plant of the American Bridge Co. at Ambridge, Pa., to Weehawken, N. J., and steel yards of the Pennsylvania Railroad at Greenville Yard, Jersey City. There it is sorted into panel formation, loaded to boats and shipped across the Hudson to Manhattan West Side Docks where overhead cranes and derricks lift the steel to trailer trucks.

Steel is picked off the trucks by cranes at the site, and placed in position. Each panel contains the steel necessary to erect the framework of two floors.

An on-the-job communications system is saving hours of time and millions of steps for the men working at

Continued on page 34

• A 1½-yd. Northwest shovel loads rock fill for Mexico's Exame Dam to 15-ton Euclid 27FD dump truck. The 126-ft. high dam, located 120 miles northwest of Zacatecas, Mexico, will require 650,000 cu. yd. of earth and rockfill for its 2,560-ft. length. Construcciones Jorge Larrea, S.A., is building the structure under contract to provide flood control and irrigation water from the Tlaltenarrgo River.

DUMPTOR no-turn shuttle STEPS UP OUTPUT 11.6%

You save 2 slow turns every trip ... travel at same speed both ways

You save turn time . . . gain more productive haul time on shuttle hauls with Dumptors because Koehring constant-mesh transmission makes the same three speeds available in either direction. Time studies prove that elimination of two turns every trip — one at the loading unit, one at the dumping unit — often saves as much as 30 seconds every round trip. On a 1,000' haul (15.4 round trips per hour) Dumptor No-Turn Shuttle Operation gains 7.7 minutes every hour. Table at right quickly shows you what this factor alone can mean to you in extra yardage gained.

What's more — fast, easy spotting and 1-second gravity dump keep production high. For faster hauling on your off-the-highway jobs, see your Koehring distributor TODAY.

KOEHRING COMPANY

Subsidiaries

Haul per UNIT

	No-Turn Shuttle Operation	2-Turn Shuttle Operation
Time Per Trip	3.9 min.	4.4 min.
Trips Per Hr.	15.4	13.6
Yards Per Hr.	69	61

(4.5 Yd. Payload)

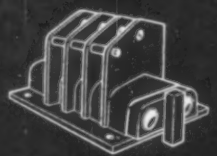
Yardage Gained — 8 yds.
(11.6% per unit per hour on 1000' haul.)

MILWAUKEE 10, WISCONSIN

Johnson Faster Operation for EXTRA TONNAGE

Most Sizes Now Available for Quick Delivery from Distributor Stock

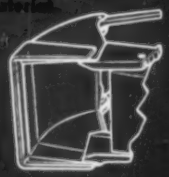
¾ to 2½ yard General Purpose Wide Range Rehandling Heavy-Duty Buckets



FASTER OPERATION, because sheaves are angle mounted to maintain natural cable alignment.

FASTER OPERATION, because double hinge construction gets big bites with fast closing in any material.

FASTER OPERATION, because sealed needle bearings on closing sheaves eliminate friction.



FASTER OPERATION, because all-welded clams, smooth inside and out, dig and dump with less resistance.

THE C. S. JOHNSON COMPANY

KOEHRING SUBSIDIARY, • CHAMPAIGN, ILLINOIS

Continued from page 31

the site. Nerve center of the system is a telephone switchboard in the corporation's field office on East 42nd Street. By speaking into a microphone, the switchboard operator can summon supervisors to strategically placed telephone stations by paging them through a loud speaker system powerful enough to be heard over all the noise.

Besides the telephone and loud speakers in the field, a telephone and loud speaker will be installed on the ground floor of the Secretariat and every fourth floor above. Thus no key man will ever be more than two floors away from a telephone—and from the central office. Installation will be made while steel erection goes ahead. The 50-watt amplifier to be used is powerful enough to be heard above the riveting.

Appoint Asphalt Engineer

Walter F. Winters, formerly district engineer for the Seattle district of the Washington State Highway Department has been appointed a district engineer of the Asphalt Institute with offices in Denver, Colo. He will be in charge, on a national level, of the Institute's special studies dealing with the far-reaching potentialities of asphalt in developing the reclamation program and also in solving allied problems of water and erosion control.

Special Plow Lays Coaxial Cables

A specially designed cable plow, nicknamed "Mickey Mouse," has been making cross-country hikes to lay the coaxial cables for the Bell System that will eventually be used to carry transcontinental television programs and telephone conversations. Referred to technically as the C-60 and weighing 27 tons, this hydraulically manipulated plow is capable of exerting 100,000 pounds of pressure. It cuts a slot as deep as five feet in which the cable is buried.

"Mickey Mouse" tows a trailer carrying its gasoline-powered control mechanism. This mechanism hydraulically moves the plowshare up and down to the desired depth and also swings the tip of the plowshare back and forth so that its edge is at the best angle for slicing through the earth. The 27-ton plow is usually pulled by three 20-ton tractors—where the going is tough, even more are used. The cable-laying caravan proceeds across the countryside as fast as a man can walk.

The ability to swing the tip of the share back and forth enables the operator, when he comes to a tough bit of terrain, to chew through in a series of sweeps. In this manner, "Mickey Mouse" has gouged a 10-ton boulder from its ancient place of repose.

Hydraulic Control

An important advantage of the hydraulic control as applied to cable laying devices is a relief valve that "blows" like a circuit breaker. Thus damage to plow or tractors from too heavy a pull is prevented when the blade comes up against something like an immovable ledge of rock.

Another novel feature has been incorporated into the plowshare. A wheel, 39 inches in diameter, has been built into the share which permits the cable to be passed through it and into the ground to the virtual exclusion of friction. This device makes it unnecessary to grease the cable as it enters the plow mechanism.

Carries 1,000 Feet of Cable

Behind the plow is a second trailer carrying a reel from which it feeds cable into the plowshare and then into the slot. The average amount of cable wound on one of these reels is approximately 1,000 feet, a trailer-cargo of about 8,500 pounds.

Tire size of the two rear wheels is

• Left: A close-up view of "Mickey Mouse," the special cable laying plow being used by the Bell System to put down its coaxial cables. Its hydraulically-controlled plowshare (right) can cut a slot as deep as five feet.

• Below: Here the big plow rolls through the Hudson Valley in New York on the apron strings of its three tractors (left to right) an Allis-Chalmers HD-19 and two Caterpillar D-8's. Trailer carrying the gasoline-powered control mechanism follows. A reel with the cable is mounted on the last rig in the procession — which moves across the countryside as fast as a man can walk.

50th birthday of the company whose products you know by the trade-mark: TIMKEN

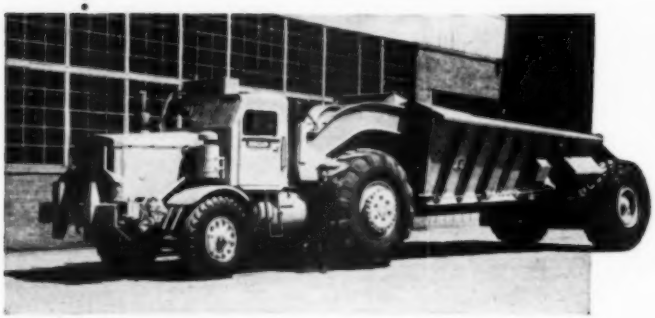
SINCE 1899 THE TIMKEN ROLLER BEARING COMPANY HAS BEEN HELPING AMERICAN INDUSTRY GET THE MOST FOR ITS MONEY

NOBODY likes to buy a "pig in a poke". In America you don't have to. You're protected by trade-marks like "TIMKEN".

Registered as a trade-mark in the United States Patent Office, "TIMKEN" identifies products made by The Timken Roller Bearing Company: Timken tapered roller bearings, Timken alloy steels and seamless tubing and Timken removable rock bits.

Experience over the years has shown Timken products to be the finest in their respective fields. And many thousands of men and women are working hard to keep them that way. No wonder it has become a habit throughout industry to look for the trade-mark "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

HALL-SCOTT *BUTANE* ENGINES help build world's largest earth dam



On the Missouri River 75 miles west of Bismarck, North Dakota, contractors are building Garrison Dam, the world's largest rolled earth structure.

Helping to move the 70 million cubic yards required is a fleet of 72 Euclids powered with Hall-Scott Series "400" Butane Engines. With a gross weight of 141,000 lbs., including 78,000 pounds payload, these units operate at speeds up to 26.8 mph!

Hall-Scott engines are performing magnificently in summer heat, in subzero cold, even in choking dust and dirt. Whatever you're hauling . . . earth, timber, oil, rock, merchandise . . . count on Hall-Scott for unexcelled power, minimum maintenance, clean operation, long life, high torque at low rpm.

For original equipment or repowering, get the facts on Hall-Scott. Butane or gasoline equipped.

HALL-SCOTT
MOTOR DIVISION
ACF-BRILL MOTORS COMPANY
Factory and Main Office: Berkeley 2, California
Philadelphia Branch: 62nd St. & Woodland Ave.

HALL POWER BY SCOTT

Branches:
Boston
New York
Chicago
Dallas
Los Angeles
Spokane
Berkeley

21.00x28 and, of the four front wheels, 14.00x24.

The coaxial cable which the C-60 was designed to install is about the thickness of a rolling pin and contains eight coaxial tubes, a pair of which, when fully equipped, is capable of handling about 600 simultaneous telephone conversations or two television programs.

Each of the copper tubes has a $\frac{3}{8}$-in. diameter. Running down the center of each tube is a copper wire about the size of a pencil lead, held in place by insulating discs. The cable is called "coaxial" because both the tube and the wire have the same axis.

Engineers of the operation and engineering department of the American Telephone and Telegraph Co. conceived the C-60. It was constructed by Arthur Rehberger and Sons, Newark, N. J.

By the end of 1948, the C-60 and other plows had placed some 6,500 sheath miles of coaxial cable in the ground throughout the nation. Recently the new plow was used by the Pacific Telephone and Telegraph Co. to lay coaxial cable along a 153-mile stretch between Yakima and Seattle, Wash. Another recent job was on a 154-mile route through the Monroe-Catskill region between New York and Albany.

Divert Flathead River At Hungry Horse Site

The spring run-off waters of the South Fork of Flathead River are flowing through a 1,180-ft. diversion tunnel and over a cofferdam. Part of the Bureau of Reclamation's Hungry Horse project in northwestern Montana, the diversion is only temporary.

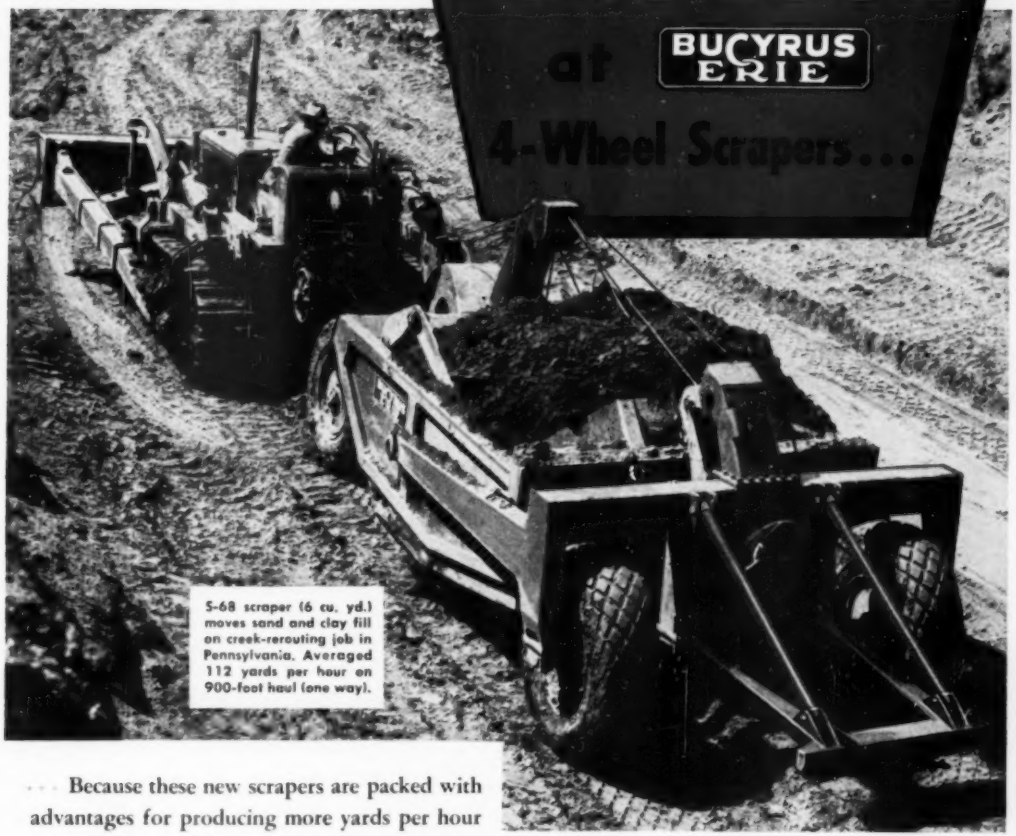
In the early part of April, the river was turned into the tunnel for the first time. The diversion, accomplished by a rock and earthfill dike built across the river permitted construction crews to fill in the center section of the upstream cofferdam. Wing sections for the cofferdam had been completed to a height of 30 feet. The center section was brought up to about 20 feet above the river bed before the spring run-off began.

Permanent diversion of the river will take place after the spring flood. As soon as possible after the flood peak subsides, the upper cofferdam will be raised to a height of 60 to 100 feet, depending on river flow conditions, to shunt the entire flow through the 36-ft. diameter diversion tunnel.

Under the present construction schedule, the diversion tunnel will carry the entire flow of the river until the fall of 1951. At that time heavy

Continued on page 40

Take a LONG LOOK at BUCYRUS ERIE 4-Wheel Scrapers...



S-68 scraper (6 cu. yd.) moves sand and clay fill on creek-rerouting job in Pennsylvania. Averaged 112 yards per hour on 900-foot haul (one way).

. . . Because these new scrapers are packed with advantages for producing more yards per hour on your dirt moving contracts. Run through the features listed here — consider what they mean to you in greater output and lower costs. Then ask your International Industrial Tractor distributor for added facts!

BUCYRUS-ERIE CO., South Milwaukee, Wisconsin

• • •

- ✓ **The famous Bucyrus-Erie double-curve cutting edge means heaped uniform loads, more pounds of dirt per cubic yard of rated capacity.**
- ✓ **Positive rolling ejection—quick clean dumping.**
- ✓ **Adjustable two-part apron — fits apron action to the job.**
- ✓ **Low-centered stability — scraper clings to steep slopes.**
- ✓ **Positive flotation—big low pressure tires, same size all around.**
- ✓ **Straight line cable reeving, no side bends — low rope wear.**
- ✓ **Adjustable bar-type push bumper, positive bowl return, reversible side cutters, sliding type bowl lock, wedge-socket cable anchors.**
- ✓ **S-Type units in 4, 6, 8, and 10 cubic yard (struck) sizes.**
- ✓ **B-Type units in 15 and 22 cubic yard (struck) sizes, for use with International TD-24 tractors.**

See Your INTERNATIONAL Industrial Tractor Distributor

Here's why Anderson Bros. bought their

Smooth, even spreads, accurately controlled in depth, saved on final finishing time for building and yard areas.

Big rubber tires, positive electric-control steer, and power-proportioning differential made it easier for operator . . . kept him moving pay yards at high speeds.

C Tournapull proved excellent for trimming side slopes. To improve drainage along railroad, this slope measured 1½ to 1 when finished. On levee, "C" easily trimmed slopes of 2½ to 1.

At Mendota, Illinois...

Anderson Bros. of Rockford, had to level a factory site and build spoil basins for a canning plant. Job called for moving 100,000 cubic yards of clay and top soil which was handled by Anderson's electric-control C Tournapull together with two tractor-scraper combinations. All three units were loading material from basin area and dumping to build enclosing levees with inside slope of 2½ to 1 and outside slope of 1½ to 1. While building these levees, a careful time study was made to check production of the C Tournapull and two tractor-scraper combinations. Anderson Bros. found the "C" moving 50% more pay yards per hour than either of the other two tractor rigs.

Tournapull hauls 3 loads 500' while crawler hauls 2 loads 400'

The high-speed, rubber-tired "C" was used on the far levee on haul of 500' one way. The two slower crawlers built closer levees on one-way haul of 400'. All three scraper combinations were loaded

Send for Complete Facts

To: R. G. LeTOURNEAU, Inc., PEORIA, ILL. Please send information on "C" TOURNAPULL:

☐ Specifications ☐ Price ☐ Delivery ☐ Would like job analysis on present operations

NAME..... TITLE.....

COMPANY..... TYPE OF BUSINESS.....

STREET..... CITY, STATE.....

Would also like information on ☐ 7-yard "D" ROADSTER ☐ Big 30-yard "B" TOURNAPULL

Second C TOURNAPULL

The "C" consistently packed in big heaping loads that averaged 10½ pay yards per trip.

Says H. A. Williams, C Tournapull Operator

"When it was so muddy crawlers couldn't climb the 2½ to 1 slope up the 9' levee, the "C" went right up with no trouble. Sometimes had to run through a foot of standing water . . . never bogged down. Used the "C" to slope 1½ to 1 ditch along U.S. 34, also to slope 2½ to 1 on levee sides. It's easiest machine on operator I ever saw!"

by the same pusher in the same material taken from the same area of the pit. Average loads were carefully measured and were checked by contractor and superintendent at **10.5 pay yards each in all three units.** Material was wet and very sticky . . . haul road was rough and slippery.

The LeTourneau "C" made the average 1000' round trip in 3.5 minutes while crawlers averaged 5.3 minutes on the 800' cycle.

Tournapull hauls 50% more yards... on 25% longer cycle...costs less to buy

In an hour the Tournapull made 14¼ trips to 9½ each for the two crawlers, delivered 150 pay yards per hour to 99 each for the crawlers. In the 10-hour day worked, this figured 1500 yards for the "C" against 990 for each crawler or over 500 more yards per day for the high-speed Tournapull. This is especially significant because the "C" was working a 25% longer haul. As a result of this profitable performance, Anderson Bros. bought a second electric-controlled C Tournapull.

Significant, too, is the fact that the crawler-scraper combinations on this job currently cost, respectively, 7% and 25% more than the C Tournapull. Even at a very conservative cost of dirt, think what this 50% extra yardage means in terms of extra profit to you!

Check into this profit-making C Tournapull. Call your LeTourneau Distributor today for production estimates on your jobs . . . see for yourself how much more profit you can make with high-speed, electric-control "C's".

Tournapull — Trademark Reg. U.S. Pat. Off. C115

LETOURNEAU PEORIA, ILLINOIS HIGH-SPEED RUBBER-TIRED TOURNAPULLS

MORE YARDS PER HOUR WITH RUBBER-TIRED POWER

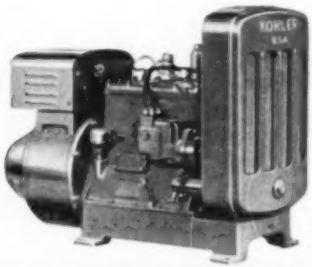
"Toe" on the downstream side of Etowah Dam. Estimated cost of the finished project is $27,000,000.00.

Night operations at Etowah Dam lighted by KOHLER *Electric Plants*

Long strings of floodlights stretching across the overhead cable provide night illumination that enables engineers, carpenters, welders and other workers to carry on round-the-clock schedules at the gigantic dam on Etowah River, near Cartersville, Georgia. Kohler Electric Plants provide the current for these, and for numerous other floodlights. When completed, the dam will be 155 feet wide at the base and 16 feet wide at the top where there will be a road for automobile traffic. On many of the world's largest construction projects, Kohler Electric Plants have been used for lighting, pumps, motors and power tools—because they are rugged, reliable, convenient and economical.

For stand-by protection, Kohler Electric Plants also fill important requirements. In public or industrial buildings, and in private homes, they assure continued operation of vital equipment when storms or accidents interrupt central station electricity.

Sizes are from 750 watts to 10 KW, with or without metal housing and skid base for portable service. Write for illustrated folder D-5. Kohler Co., Kohler, Wisconsin. Established 1873.



Kohler Electric Plant 3A21, 3KW, 115 volt AC. Length 41", width 16", height 27¼".

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS

News

Continued from page 36

steel gates will be dropped into place to block the upstream entrance of the diversion tunnel, and storage of water behind the dam will begin. One million-acre foot of water will be stored by the Spring of 1952 behind the dam which will be about 400 feet high by then. The multiple-purpose dam will be 520 feet high when completed.

After the diversion tunnel has served its purpose, it will be sealed permanently with a concrete plug 360 feet long to be placed near the upper end of the tunnel. Approximately 170 feet of the lower end of the diversion tunnel will then be lined with concrete to form the lower end of the "glory hole" spillway.

Spillway Excavation

Excavation of the spillway, highest "glory hole" type in the world, is nearing completion. The big job of drilling and blasting the 35-ft. diameter, 955-ft. long spillway bore (see cover photo) through the solid rock of the canyon wall is being handled by the Boyles Brothers Drilling Co. of Salt Lake City, Utah, under a subcontract from General-Shea-Morrison Co., prime contractors for the dam and power plant. Excavation of the tunnel, which will require removal of approximately 30,000 cu. yd. of rock, was started last August. A 2½-ft. reinforced concrete wall will line the full length of the tunnel.

Final scaling of rock from the walls of the tunnel is being accomplished by excavation crews working from a scaling jumbo which is lowered by power winch and steel cable down the 50° incline of the spillway bore.

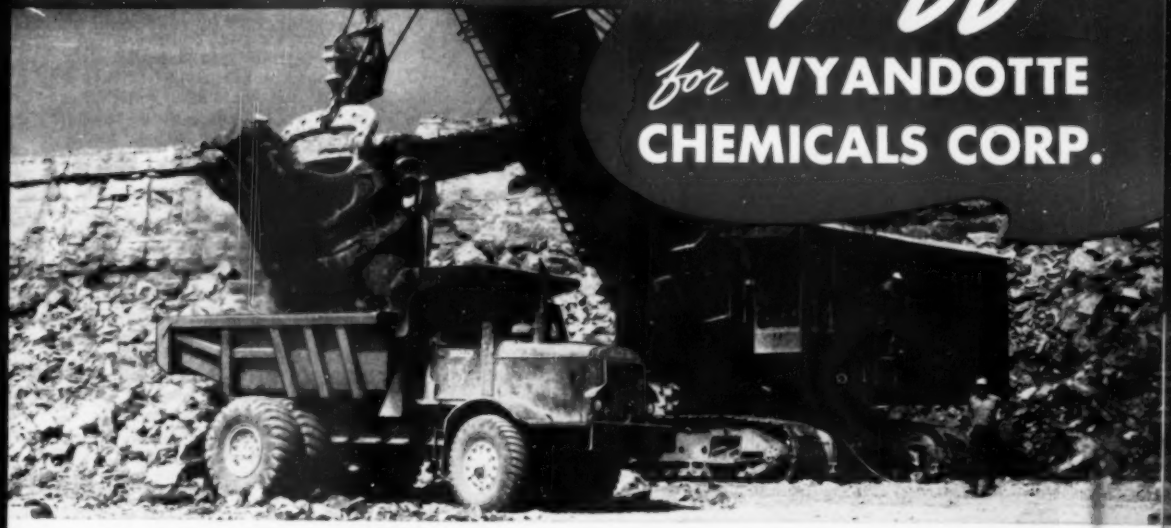
Water Will Drop 490 Feet

When Hungry Horse Dam is completed, overflow water from its 3¼ million acre-foot reservoir will plunge over the lip of the "glory hole" spillway and drop 490 feet, approximately the height of a 47-story building, on its 1,125-ft. return journey under the dam to the South Fork 550 feet downstream from the powerhouse. The maximum discharge capacity of the spillway will be 45,000 cfs. A ring gate, with a diameter of 64 feet and capable of moving 12 feet up and down, will be installed in the spillway crest to control the level of the 34-mile long reservoir.

After the river flow is back to normal this summer, a second cofferdam will be constructed 1,100 feet downstream and the section of river channel between the two cofferdams will be pumped dry. Excavation crews of General-Shea-Morrison will begin removal

"EUCS" Pay Off

for WYANDOTTE CHEMICALS CORP.



At Alpena, Mich., Wyandotte Chemicals Corporation operates one of the world's largest limestone quarries — another job where "Eucs" are paying off by doing more work at less operating and maintenance cost.

Thirteen Rear-Dump Euclids of 22-Ton capacity replaced an electric haulage system for moving the rock from quarry to plant. Operating two shifts per day and six days per week, the "Eucs" haul approximately 800 tons per hour. The round trip averages 1¾ miles, with a maximum grade of 4 per cent. The "Eucs" are loaded with stone by shovels of 5 and 6 yd. capacity, and are used for removing overburden during winter months.

Wyandotte standardized on Rear-Dump Euclids because of their proved dependability and efficiency in mine and quarry operations. Their large capacity and fast travel speeds have increased production and lowered hauling costs at Alpena.

Euclid equipment has proved profitable for hundreds of owners on a wide range of off-the-road work. Your Euclid Distributor or Representative will be glad to discuss your requirements and show you how Euclids can do a better job for you.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

CABLE ADDRESS: YUKLID — CODE: BENTLEY

EUCLIDS *Move the Earth*

of earth and rock from the river channel to expose the solid bedrock upon which the first concrete for the dam will be placed by early Fall.

Bureau engineers will make their first major use of a soot-like fly ash, called "pozzolan," in constructing the giant structure. Between 30 and 40 per cent of the cement to be used in the dam is to be replaced by the new material, thereby saving approximately $1¼ million in construction costs.

An estimated additional saving of $3½ million is expected by the reduction of the amount of cement per cu. yd. of concrete to be used. Bureau engineers may use as little as ½ barrel of cement in each cu. yd. of mass concrete in Hungry Horse Dam, plus pozzolan. This will be the lowest cement content ever used by the Bureau in a mass concrete dam, the lowest previous ration having been one barrel per cu. yd. at Grand Coulee.

The pozzolan to be used in Hungry Horse Dam is a waste product of combustion and is obtained from the flues of coal-burning industrial furnaces in the Chicago area. Its cost delivered at the project is approximately $10 a ton less than cement.

Studies conducted by concrete experts in the Bureau's research laboratories show that in addition to the saving in cost, the use of pozzolan also will result in a better dam. Advantages gained from use of the fly-ash, which is essentially a siliceous material, include increased workability of the concrete, increased impermeability, and less segregation and bleeding. The most important advantage results from the fact that pozzolan generates less heat while hardening than cement. This reduces volume change in the mass concrete and cuts down the amount of artificial cooling required.

The story behind the use of the sooty fly-ash began some 2,000 years ago on a small island called Pozzolan off the coast of Italy. Builders of ancient Greek aqueducts, parts of which are still standing, discovered that use of a volcanic ash, found on the island, in their cement mixes resulted in a stronger, more durable building material. However, little progress was made in the use of pozzolan until recent years, when research resulted in perfection of formulas and methods of using the material in construction of mass concrete dams.

HOW TO SELECT A CLAMSHELL BUCKET

Pick the type that fits most of your needs

Catalog 2076 contains many practical tips on bucket selection and use. Write for your copy today.

It's how the bucket performs on *your* operations that means the difference between ordinary and peak profits. For the bucket performance that puts extra money in your pocket, select the type of Blaw-Knox bucket built to handle the bulk of your work most efficiently . . . whether it's rehandling, dredging, hard digging or general purpose. Then by adding or removing certain accessories . . . center counterweights which facilitate bucket opening; scoop counterweights that add digging power; side, corner or bottom teeth of the correct style for maximum penetration . . . your Blaw-Knox bucket will fit practically all your operations. Blaw-Knox can give you the engineering service that makes possible the proper bucket selection for maximum profit.

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY
207 Farmers Bank Bldg., Pittsburgh 22, Pa.

BLAW-KNOX CLAMSHELL BUCKETS
THE MOST COMPLETE RANGE OF SIZES AND TYPES

Kelce New Head Of Sinclair Coal Co.

New president of the Sinclair Coal Co., Kansas City, Kans., and its 25 employee-owned affiliated companies is L. Russell Kelce. He succeeds Grant Stauffer who died March 31.

Two younger brothers were elected vice-presidents. Merle C. Kelce, a vice-president in charge of the St. Louis office, and T. L. Kelce, were named executive vice-president and vice-president respectively.

Other officers elected at the annual meeting are A. R. Stock, vice-president; W. G. Parrotte, vice-president; Earl A. Riley and T. C. Cheasley, assistants to the president; S. M. Case, secretary, and Roy O. Park, treasurer.

Besides its big coal mining and wholesale coal operations, Sinclair's affiliated companies include farming, railroad, oil and manufacturing enterprises. The company owns properties in Missouri, Kansas, Oklahoma, Illinois, Kentucky and Alabama.

In 1948, the Sinclair coal mining group ranked as the nation's 14th largest coal producer, turning out in excess of five million tons. In 1947, it was 21st.

Kelce himself mined coal as a young man. He left a job as superintendent of a Pittsburgh, Pa., mine for military service in World War I. After the war he started a strip coal mine at Dawson, Okla., just outside Tulsa. He became acquainted with Stauffer during

this time and together they began their first property—a coal mine at Porum near Muskogee, Okla. It was also a strip mine, the method they used to build their industrial empire. In 1929 they acquired the land to start the Hume-Sinclair Coal Co., Hume, Mo., which became the largest strip mine operation in the country, producing about 1¼ million tons in 1948.

Develop Device for Finding Surface Profiles

An instrument which determines the profile of the ground surface merely by driving a vehicle, in which it is mounted, over the area was described at the Spring meeting of the ASCE in Oklahoma City, Okla.

The principle of the pendulum is utilized in the design of the meter. Readings can be taken at regular intervals or whenever desired. Over a given 1-mile stretch of road of moderate roughness, the meter, on repeated trials, will repeat itself with an average variation of about 3/10 of a foot. Roughness of the ground does not interfere with the operation of the device, and any route can be taken provided the vehicle can be driven over it. In mounting the unit, no special changes or additions are necessary in the vehicle except to make the necessary connections to one of the wheels.

Unofficial cost estimates indicate that the cost per mile of survey with the meter is about $2.25 as compared with $7 per mile using ordinary surveying methods. With this electromechanical device, profile surveys can be made by one man in all types of weather, in daylight or after dark with equal facility. The instrument is useful in road and railroad building, canal construction, excavation and military engineering.

Development of this new device, called the Stanolind elevation meter was undertaken by research laboratories of the Stanolind Oil and Gas Co., Tulsa, Okla. The authors of the paper delivered at the meeting are all with Stanolind: Daniel Silverman, exploration research supervisor; J. D. Eisler and J. P. Evans.

Report Triaxial Compression Tests

At another convention meeting, Herbert E. Worley, research engineer of the Kansas Highway Commission, told members that over 11,000 triaxial compression tests of Kansas soils have been conducted in connection with the design of 1,000 miles of the state's highways. Less than 1% of highways built according to the design for flexible pavement developed by the commission have shown distress.

Worley stated that under field con-

50 m.p.h. HAULS

Without excessive tire wear!

New La Crosse DF6C easier on tires...easier on frame...easier on equipment you are hauling

THIS new LaCrosse spring-mounted tandem axle trailer lets you move big loads at 50 m.p.h. — with *no more tire wear than you get at 20 m.p.h. with ordinary, solid axle trailers.* Lessens hazards of overloading . . . permits more trips per day at higher profit for you. Also eliminates punishing jolts when loading crawler equipment. Choice of 19, 24, 27 or 33-ton capacities . . . flat, drop or low-drop models . . . all necessary accessories.

Spring-mounted for a Smooth Ride

2 H-beam axles, supported by 2 heavy-duty alloy steel springs, cushion road shocks, keep DF6C platform and equipment riding level over bumps. Axles and springs, connected by double Y-shaped brackets, absorb brake torque and assure positive wheel alignment at all times. LC-1

Check Today!

LA CROSSE TRAILER CORPORATION, La Crosse, Wis.

☐ Rush complete facts on new 19 to 33-ton spring-mounted trailer.

☐ I may be interested in this type trailer about..... (date)

for hauling ..... (type of equipment)

Name..... Title.....

Employed by.....

Address.....

City..... State.....

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Low-Cost TRAILER TRANSPORTATION

That's right, honey, they're Crosby Clips . . . so you won't weasel out of this engagement!

9902

Industry buys more

CROSBY CLIPS

than all other drop-forged fasteners!

Fasten wire rope with CROSBY CLIPS. Safe, simple, speedy . . . applied anywhere by one man with one wrench. *Drop-forged*, not cast. Hot dip galvanized. All sizes . . . for $\frac{1}{8}$" to 3" wire rope. Distributors everywhere; made only by AMERICAN HOIST AND DERRICK CO., St. Paul 1, Minnesota.

ALSO MAKERS OF THE AMERICAN HANDIWINCH AND AMERICAN BLOCKS AND SHEAVES

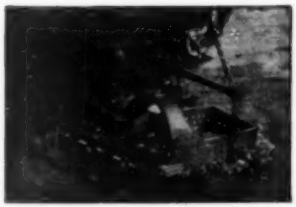
Operators Say:

OMAHA DRAGLINE BUCKET

Tops 'em All!

IN PROFIT AND PAYLOAD

"I like a dragline bucket that fills easily in two to three bucket lengths without time-wasting and strenuous jockeying for a new position. That's why I like Omaha Dragline Buckets, because at the end of the day my quota is filled, and I'm not tired out."



Write for complete catalog.

It's Omaha Dragline Buckets for Tops in Job Performance. In all kinds of digging there's a full load with every cast with an extra payload built-in by the elimination of surplus weight. On the job and on the job record, Omaha Buckets pay off with a profit.

DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

ditions the materials surrounding a column of soil under a wheel load provides lateral support to it. In a similar manner, a triaxial compression test provides lateral support to a specimen of the soil while a vertical test is applied to it. The test allows expulsion of water from the specimen as the test progresses similar to the loss of water under field conditions. Worley called the tests "economical" for the design of flexible pavements.

From the States

Approve Colo. Toll Highway

A resolution specifically authorizing the construction of a 22-mile toll superhighway between Denver and Boulder, Colo., has been approved by the Legislature. Earlier, the governing body passed a bill clearing the way for construction of the $5,300,000 project.

The resolution authorizes the creation of a special sinking fund and pledges the state to guarantee at least 30% of the bonds issued to finance the highway. Proponents of the road claim it can be completed in 18 months.

Nearly eight miles would be cut from the present route between the two cities by the contemplated 4-lane highway. The only access point would be at Broomfield. Tolls of 25 cents for passenger cars and 40 cents for trucks have been suggested.

Ind. Increases License Fees

A new Indiana law provides that automobile owners will pay two dollars more on all makes and models, while truck license costs will be up as much as $350 for larger trucks. Trucking interests went along with the license fee boost, which is expected to yield $3 million a year, as a concession in return for liberalization of truck size and weight laws, as provided in other legislation.

Another bill which became law reduced the State Highway Commission's share of motor vehicle funds from 60 to 53% and gave both cities and counties bigger slices of the fund for maintenance of county roads and city streets. The counties will get 32% of the fund and 15% will go to cities and towns.

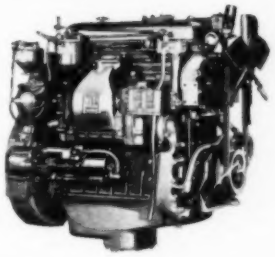
Kentucky Announces Road Budget

A record total of $48,798,172 for road building, planning and maintenance will be spent in Kentucky during the state's highway fiscal year, 1949-50, which started April 1. The new budget is based on an estimate of the state's Department of Revenue that money earmarked for road funds

"They don't come any better."

Says Master Mechanic Ralph Stinson of Missouri Valley Construction Co.

MEN who really know—men, like Ralph Stinson, who have seen General Motors Series 71 Diesels at work—offer proof of their performance: "They hold up better and are easier to maintain than any other Diesel engine in the same horsepower range. They don't come any better," Mr. Stinson says. And he cites his records to back up his statement:



In the summer of 1946, Missouri Valley Construction Co. replaced three 3-ton dump trucks with a pair of Koehring Dumptors, powered by GM 4-71 Diesels. Since then, the two units, now quarrying limestone at Warren, Mont., have tripled production with lower fuel costs. Maintenance has been considerably lower too, Mr. Stinson reports.

General Motors Series 71 Diesel engines are designed to produce more power at lower cost. Their sturdy two-cycle operation delivers power at every piston downstroke—smooth, dependable power that responds instantly to varying load demands. They're sensible in size and weight, and compact construction makes them easy to install. Simplified design makes service and maintenance much easier.

All these features combine to make your operation easier and more profitable. It will pay you to investigate the possibilities. Get the complete story from your nearest distributor or write to us.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Cut handling costs
Increase Output

ONE MAN----- ONE MACHINE

The ½ cu. yd. Sauerman Slackline Cableway in picture reclaims tailing from a huge pile in valley and conveys the tailing uphill over 1,000 ft. to a bin that feeds by gravity into mill. This small machine has reclaimed a half million tons at small cost. It has made easy work of a tough problem.

Simplicity of operation — manpower conservation — operating economy — output of work — any of these are reliable measurements for the performance of a

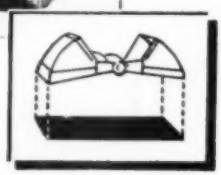
SAUERMAN
Slackline Cableway

When your problem is digging deep in any kind of ground — wet or dry — loose or hardpacked — dredging material from pits, ponds, rivers and lifting to a high point, a Sauerman Slackline Cableway can do it efficiently at low cost.
One easily trained man handles the entire operation of digging, hauling, lifting and dumping.
Upkeep simple — initial cost low — power consumption small. WRITE TODAY FOR COMPLETE CATALOG.

SAUERMAN BROS., INC.
574 S. Clinton St. Chicago 7, Ill.

ERIE *Barge Type* Bucket

In this type the large deck area achieved means bigger payloads in stock piling and barge rehandling work. Erie's booklet on 2-line buckets gives you complete data on this type and 3 other classes of Erie Buckets. Write for copy today.



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¾ Yd.	27.21 Sq. ft.
1 Yd.	30. Sq. ft.
1½ Yd.	32.3 Sq. ft.
1½ Yd.	36.7 Sq. ft.
1¾ Yd.	42.4 Sq. ft.
2 Yd.	45.1 Sq. ft.
2½ Yd.	53.5 Sq. ft.
2½ Yd.	57.6 Sq. ft.
3 Yd.	60.5 Sq. ft.

Write for Catalog **2L-1** *Today*

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STEEL CONSTRUCTION COMPANY
496 GEIST ROAD • ERIE, PENNSYLVANIA

will total $45 million during the fiscal year. About $3¾ million in revolving funds and a carryover of unspent cash in the last fiscal year are also included in the proposed budget.

The budget is $14 million more than last year's. The increase is due mainly to the higher tax rate on gasoline enacted by the 1948 Legislature, increased use of gasoline, and anticipated heavier collections of license fees.

Kentucky's budget includes $8,365,672 for all types of Federal Aid construction to be matched with a like amount from the Federal government. Approximately $14¾ million will be expended on rural roads, including $9¾ million from the 2-cent increase in the gasoline tax and the regular legislative appropriation of $5 million. A total of $10½ million is budgeted for road maintenance.

On May 13, the Kentucky Highway Department held its biggest contract letting in history. Contractors bid on 126 projects covering 500 miles in 53 counties.

April awards for highway construction placed with contractors by the state's Department of Highways established a new all-time record of over $5½ million. Highest prior month was October, 1947, when awards totaling slightly over $4 million were made. Total road work award for this calendar year amounts to over $9 million, another record for the first four months.

Contracts awarded included a high volume of Federal Aid work. Many state and rural jobs were also started.

Pa. Aids Philadelphia Road Plans

A 5-year multi-million dollar road improvement program for Philadelphia has been approved by the Pennsylvania Legislature. The legislation clears the way for a 5-year plan which may entail an expenditure by the state of approximately $100 million.

The bill repeals a section of a former act which limited the expenditure of state highway funds in Philadelphia to $12 million annually for new construction and maintenance. This financial limitation made it impossible to carry out the comprehensive street, road and bridge construction program for Philadelphia which the State Highway Department has charted with the approval of Gov. James H. Duff.

Enactment of the bill will assure an immediate start on plans for construction of the Schuylkill expressway from the proposed new eastern terminus of the Pennsylvania Turnpike at King of Prussia to mid-city Philadelphia, with connections to Roosevelt Boulevard, the Delaware River bridge and southwestern Philadelphia. It will also release funds for other major projects.

Ideas

Continued from page 27

slide under ordinary circumstances, it does not need to be anchored in place. The Slattery bridge also takes far less time to erect—although a crane is needed to move it—than does the wood plank bridge.

A variation of this idea could be used for any number of purposes—prefabricated shorings, unloading stages and ramps are a few applications. Any variety of shapes and forms can be prepared to provide sturdy, movable supports and platforms.

Ninety Feet

Continued from page 17

ern end of the sewer and the early footage that followed were dug with a Northwest 6 dragline. This was an open-cut operation before underground mining got into full swing.

Much of the concreting on Contract 7 operations is done by running the Pumpcrete hoses into the frequent shafts. But since even on this part of the job, the shafts were 800 feet apart, it was found necessary to drill holes between the shafts to preserve maximum pumping efficiency.

Drill Holes For Concrete Lines

These holes were bored from street level to the underground excavation with a Ka-mo augur on an air drill. They were put down at 400-ft. stations, thus dividing the 800-ft. distance between shafts. Concreting on the previous Contract 6 section of the sewer job was all done through drilled holes due to the great distance between shafts. The drilled holes are about 1½ feet in diameter and are backfilled after they have served their purpose.

The noisy work, running as it did through the sedate residential district, might have elicited numerous complaints from nearby dwellers. However, a much appreciated assist from the officials of Winnetka, Wilmette, Kenilworth and Evanston reduced complaints to a bare minimum. One of the village chiefs wrote letters to those who lived along the route telling them when compressors would be working in the vicinity and asking for patience.

In addition to the equipment mentioned, the Paschen contracting firm uses seven diesel-powered compressors; two Ingersoll-Rands, four Chicago Pneumatics and a Gardner-Denver. Standard Oil diesel fuel runs the cranes.

About 300 men are employed by Paschen Contractors, Inc., on the intercepting sewer project.

Job Personnel

Supervisory personnel on the job includes Jack Paschen civil engineer for the contractor; Mike Dilich, superintendent of the entire sewer job; Chester Andree, senior engineer representing the Chicago Sanitary District; and Frank Corso, chief operating engineer for Paschen Contractors, Inc. The president of the Chicago contracting firm is Jake Paschen, father of the young engineer on the sewer job.

While it is building the new intercepting sewer, the firm is also constructing an addition to the Edison Company's 22nd Street plant in Chicago. They have a number of buildings to their credit around the Windy City. At one time or another, they have erected a Coca Cola plant, the Medina Athletic Club, Foreman Bank Building, Carbon and Carbide building, Chicago, Uptown and Northtown theatres, and the end of the Municipal Pier.

The OSGOOD AIR-CUSHION CLUTCH*

Measured in terms of operating efficiency, dependability and economy, the new OSGOOD Air-Cushion Clutch is the greatest advancement in power shovel design in 25 years. It completely eliminates jerking and grabbing . . . provides fast, velvet-smooth action that permits accurate control of loads at all times and reduces wear on both men and machines.

The OSGOOD Air-Cushion Clutch combines the best features of the disc-type clutch with all the advantages of direct air engagement, and provides the simplest, most trouble-free method ever designed for applying air pressure. There is only one working part —no intricate system of cams, levers, bolts, pistons or valves. Adjustments are seldom necessary. And this clutch automatically compensates for wear on clutch linings. It's another OSGOOD "FIRST" that means faster production and more profits for you.

Write for details about how this exclusive OSGOOD feature can save you money.

*PATENTED U. S. PATENT OFFICE

POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

THE OSGOOD CO. THE GENERAL CO. EXCAVATOR

MARION OHIO

DIESEL GASOLINE OR ELECTRIC POWERED • ¾ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

Secaucus

Continued from page 19

feet long, were driven on 10-ft. centers through a previously-placed blanket seven feet thick atop the swamp muck, then through the underlying muck to relatively firm bottom as far down as 90-feet. The pipe was then loaded with coarse sand aggregate under 125 psi and withdrawn, leaving a column of sand inside the muck. After the drains had been driven, the entire area was covered with borrow fill to conform to the completed graded section. The load was applied gradually so that lateral pressures would not build up sufficiently to cause horizontal movement of the muck itself.

The 91-ft. mandrel was driven by a McKiernan-Terry S-5 single-acting air hammer, mounted on a Manitowoc 3500 Speedcrane with 80-ft. boom and 115-ft. leads. The 25-ft. mandrel was driven by a McKiernan-Terry 9B-3 double-acting air hammer used on 60-ft. leads, mounted on a Bucyrus-Erie 38-B crane equipped with a 55-ft. boom. After filling with sand, mandrels were pulled by the cranes with the assistance of 115-lb. air supplied by two Ingersoll-Rand air compressors.

Excavate in Shallow Spots

Where muck was shallow—nine feet or less in depth—it was removed by draglines and replaced with porous-solid material from a borrow pit in Delawanna. Two Bucyrus-Erie 54-B draglines with 80-ft. booms and 3-yd. buckets worked on 40-ft. mats to excavate 250,000 cu. yd. of wet material. Most of this work was done in mid-winter since freezing weather made the muck more stable.

Mud was simply cast to the sides of the right of way where it eventually disappeared in the fluid mass. Many stumps were encountered and were pulled out by the draglines. Porous-solid material required ran to 500,000 cu. yd.

Dry excavation on the entire highway ran to more than a million cu. yd. Most of this was handled by 5-yd. Bucyrus-Erie 120-B shovels loading to 32 10-yd. Mack trucks. The S-3 project is scheduled for August completion.

Lilliputian

Continued from page 21

compact air compressors have been designed for towing behind either the Mule or the Beetle. Using standard pumps and motors, they will deliver 60 cfm with a total weight of less than 1,000 pounds. Their tubular frames are their air tanks.

Another piece of the miniature equipment is an efficient fire trencher

DREDGES

HYDRAULIC
DIPPER
CLAMSHELL

Bolted sectional steel hulls for landlocked, inland waters

If you need a dredge, write us!

AMERICAN STEEL DREDGE CO. INC.
FORT WAYNE 1 · INDIANA · U.S.A.

DESIGNERS AND BUILDERS OF DREDGING EQUIPMENT SINCE 1905

SAVE TIME and MONEY

P&H Hartop hard-surfacing electrodes make this tractor drive-sprocket like new.

WN-300 range 30 to 375 amps water-cooled gasoline engine. This efficient unit available in 2 and 4-wheel mountings.

P&H Portable Welders make on-the-spot repairs at low cost—reduce job delays

Owning a P&H Welder for making quick on-the-spot repairs is like having extra job insurance against costly delays.

Here are a few important features:

EASY OPERATION — only one heat control, no gadgets to cause confusion.

ELECTRIC SELF-STARTER—gives you your welding current easily and quickly.

LOW FUEL CONSUMPTION AND LONGER ENGINE LIFE — an idling device reduces engine speed when the arc is broken.

A LONG-LIFE, TIME-PROVEN WELDING GENERATOR —the same design as the P&H welders that are so popular in thousands of industrial plants.

A WIDE RANGE OF MOUNTINGS — skid, 2- and 4-wheel with pneumatic tires.

Two models are available — the WN-200 with a welding-service range of 30 to 260 amps, and the WN-300 with a range from 30 to 375 amps.

See your nearest P&H Welding Distributor. Get all the cost-cutting facts about P&H Portable Welders. Put them on your jobs as standard equipment to keep costs down.

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4517 West National Avenue
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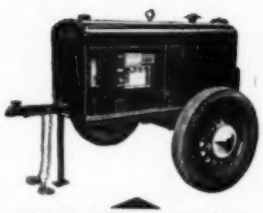

Model WN-200 welding range 30 to 260 amps. Air-cooled gasoline engine. Equipped with power take-off for operating AC electric tools, even while you're welding. Available with skid or portable mounting. Portable units can be towed at highway speeds.

Hard-surfacing grousers with P&H Hartop.

for open forests and grazing lands. Of the walk-behind cultivator type, it cuts a trench two feet wide and also spreads the dirt to give a 4-ft. fire break. Its spiral digger is unaffected by rock, and the trencher is power steered.

The Beetle also has an attachment for cutting fire trenches and drainage ditches alongside the trails. Two 22-in. disks are mounted like a V-plow in the place of the dozer blade. They peel out two to six miles of fire trench one foot deep per hour.

High pressure fog-spray pumps and other fire-fighting equipment have been adapted for hauling on the Mule trailers. Another adaptation is the mounting of a lightweight, 2½-kw gas-electric generator on a small aluminum wheelbarrow. One man pushes the wheelbarrow along the trail or through the woods. Two other men range to each side, clearing brush and small trees with 14-in. electric chain saws, attached to the generator by 200-ft. cables. The wheelbarrow saw is a fast and economical method of clearing brush or cutting fire breaks.

The machines may be small but collectively they are today's Blue Ox of the timberlands.

MANGANAL

(Trade Mark Reg. U. S. Pat. Off.)

11 TO 13½% MANGANESE-NICKEL STEEL

FLAT - ROUND - SQUARE

APPLICATOR BARS

-Cuts Welding Costs

In fact, all Manganal products cut welding costs! Whether it's our Applicator Bars, Wedge Bars or Hot Rolled Plates, they're all designed to eliminate practically all of the long, tedious job of building-up the weld material to the shape desired. In every application where Manganal Bars and Plates can be used, they cost less than the equivalent weight of welding electrodes. Manganal work hardens under impact to 550 Brinell. Tensile strength up to 150,000 p.s.i. USUALLY LASTS MUCH LONGER THAN NEW PARTS!

Bucket being rebuilt with Manganal Round and Flat Applicator Bars.

FREE: Write for your copy of the latest "Manganal Marketer."

STULZ-SICKLES CO.

SOLE PRODUCERS

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NAME OF NEAREST DISTRIBUTOR ON REQUEST

GREATER YARDAGE! LOWER COST!

WELLMAN Williams WELDED BUCKETS

Wellman Buckets cost less to maintain because they are ruggedly built. They deliver bigger payloads because they are properly designed. The superior engineering in Wellman Buckets gives the operator better balance, easier handling, cleaner digging. Wellman pioneered the unique construction that pays off in greater yardage at lower costs. There's a Wellman Bucket for every service.

SEND FOR BULLETIN

THE WELLMAN ENGINEERING COMPANY

7002 CENTRAL AVENUE CLEVELAND 4, OHIO

Notes from the manufacturers

Osgood Co. and **General Excavator Co.,** Marion, Ohio, have appointed the following new distributors: Contractor's Service, Inc., 317 W. Worthington Ave., Charlotte, N. C., for the entire state of South Carolina; Dulaney Service Co., R. R. 1, Box 96, San Antonio 4, Tex., for southern Texas; and Manning Equipment Co., 17560 Chicago Ave., Lansing, Ill., for the northern half of Indiana, excluding Lake, LaPorte and Porter Counties.

Goodyear Tire and Rubber Co., Akron, Ohio, has appointed M. W. Sledge as assistant manager of the belting sales department, replacing the late W. P. Hallstein. Sledge has been with Goodyear since 1935, serving in various positions, the last that of mechanical goods field representative in Knoxville, Tenn. Goodyear also announced the reorganization of the Mechanical Goods sales division into four sales divisions. The Eastern sales division, consisting of Boston, New York, Pittsburgh and Cleveland districts, will be under the head of O. A. Schilling. The Central sales division, comprised of Chicago, Detroit, Minneapolis and Cincinnati (being formed) districts will be supervised by H. E. Langdon. R. B. Warren will take over the Southern division including Charlotte, Atlanta, St. Louis and Dallas districts. R. G. Abbott, who will continue to operate as district manager in Los Angeles will head the Western sales division.

General Tire and Rubber Co., Akron, Ohio, has named Charles L. Howes, Central division manager, to the position of Southwest division sales manager. He will headquarter in Dallas, Tex., supervising sales activities in the territories now serviced by General's branch offices in Dallas, Memphis, Houston, St. Louis and Kansas City. Howes has been with General for 26 years.

Pettibone Mulliken Corp., Chicago, Ill., has announced the appointment of Paul E. Lundquist as sales manager on the newly-formed Construction Equipment division. He is former vice-president of the Republic Drill and Tool Co.

American Hoist and Derrick Co., St. Paul, Minn. has announced the election of Stanley M. Hunter by the Board of Directors to fill the newly-created position of executive vice-president. Hunter joined the sales department of the company in 1936 and has served as vice-president of sales and been a member of the Board of Directors since 1945.

George Haiss Manufacturing Co., Inc., New York, N. Y., division of Pettibone Mulliken Corp., Chicago, announces the appointment of Dan G. Caywood, Jr., as its exclusive representative on conveyors and coal loaders in Maine and New Hampshire and part of Massachusetts.

Gar Wood Industries, Inc., Wayne, Mich., has made Edward B. Hill, formerly general sales manager, vice-president in charge of sales. Hill joined Gar Wood in 1936, was appointed general sales manager in 1947.

Drake American Corp., New York, N. Y., has appointed Dennis E. Tiberiis as director of sales. He will supervise the activity of the export and import divisions of Drake as well as the Hill Diesel Engine division which handles both domestic and export sales of Hill diesel equipment.

Hercules Steel Products Corp., Galion, Ohio, has resumed production of its split shaft power takeoffs, discontinued for some time because of shortages. The company again offers direct, offset, side and dual drives for long and short wheelbase trucks. The units are for transmission of the full hp and torque of the truck motor for operation of air compressors, electric welders, winches, pumps, rock crushers, cement mixers, drills and other truck-mounted equipment.

Hewitt-Robins, Inc., Hewitt Rubber Division, Buffalo, N. Y., has announced the appointment of the Mine Service Co., Lothair, Ky., as exclusive distributor in Perry, Letcher, Knott and Leslie Counties, Kentucky. The company will also represent Robins conveyor division.

The Boardman Co., Oklahoma City, Okla., has announced the appointment of I. L. Mynatt, formerly with Wentz Equipment Co., Salina, Kans., as sales manager in charge of road building and construction machinery sales. Boardman has also located a new branch at 3415 Sand

DOES IT WITH A ROGERS

DOES IT WITH A ROGERS

ECK MILLER
OF OWENSBORO, KENTUCKY

using a Rogers Model D-35-D and a Rogers Pole Type Trailer loaded with 80,000 lbs. of steel tank 67 feet in length. The conventional trailer mounts a fifth-wheel type of bolster which supports the front of the load and tows the pole trailer which carries the rear of the load.

A. B. BURTON CO., Inc.
OF LYNCHBURG, VA.

Moving this heavy Northwest power shovel from job to job presents no problem to the A. B. Burton Co. when they have their D-50-D Rogers semi-trailer to rely upon.

and* YOU CAN DO IT WITH A *ROGERS trailer, whether the jobs involved require the hauling of light, medium or heavy equipment. Why not learn in detail just what Rogers has to offer? Write TODAY for your copy of the NEW CATALOG.

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DESIGNERS and BUILDERS of HEAVY DUTY TRAILERS SINCE 1915
136 ORCHARD ST. ALBION, PENNA.
Export Office: 50 Church St., New York 7, N. Y. Cable address: "Broscites"

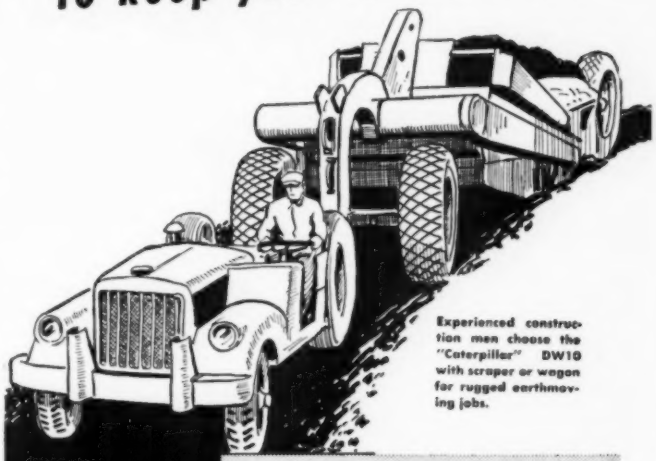
Springs Rd., Tulsa, for sales and service of certain Allis-Chalmers, Buckeye, Gar Wood, Baker, Novo and Wheeler equipment. Jim Pulliam assisted by Harold Rodgers is in charge of this new branch.

Euclid Road Machinery Co., Cleveland, Ohio, has appointed V. L. Snow as domestic sales manager, succeeding the late W. W. Paape. Snow joined the engineering department of Euclid in 1935. He served as assistant chief engineer until 1942 when he was placed in charge of industrial sales and the sales development department. Succeeding Snow as assistant sales manager is J. W. Bloomquist who joined Euclid as district representative in the Minnesota territory in 1945.

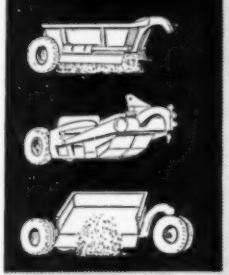
D-A Lubricant Co., Inc., Indianapolis, Ind., has appointed Warren E. Moore as sales and service representative in its southern Illinois territory. Since 1936, except for two years in the Army Air forces, Moore has worked in this territory either as a mining plant engineer or as a sales engineer.

B. F. Goodrich Co., Akron, Ohio, has made Charles L. Campbell sales development manager of the eastern division which comprises the Albany, Boston, Buffalo, New York City, Pittsburgh and Philadelphia districts. He has been manager of the Philadelphia district of the replacement tire sales division since 1936. He has been with Goodrich since 1912, was manager of the Seattle, Kansas City and Charlotte (N. C.) districts before being named to the Philadelphia managership. He is succeeded in this position by L. O. Veith who has been manager of the company's Harrisburg, Pa., retail store for the last two years. Veith joined Goodrich 21 years ago.

It takes SERVICE to keep you IN FRONT



Experienced construction men choose the "Caterpillar" DW10 with scraper or wagon for rugged earthmoving jobs.



Experienced construction men also choose a distributor that can keep them out front . . . ahead of schedule . . . under the budget with on-the-spot repair service and authorized parts when needed. Our 25 job-trained mechanics and 8,000 sq. ft. of space devoted exclusively to authorized parts inventory are at your service 24 hours a day!

T. Southworth

GLENWOOD ROAD TRACTOR & MACHINERY CO. INC. MENANDS, NEW YORK

ALBANY, NEW YORK TELEPHONE 5-5255

OWENS ARE 'WATERDOGS'

at HOME in the WATER . . . and 'DOGS' for PUNISHMENT

Owen Type DX Extra Heavy Duty Buckets are ideally suited for under water dredging operations. Sealed, grit-proof bearings are impervious to water and abrasive materials. Proper shell curvatures assure complete and rapid discharge of wet, sticky clay and sludge.

Write for the Owen Catalog TODAY.

OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAYS WORK

A MOUTHFUL AT EVERY BITE

THE OWEN BUCKET COMPANY

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GENERALS ARE DOING AMAZING JOBS *Every Day...Everywhere!*

The *General H. C. T.* Truck Tire is designed with a deep, zig-zag tread that disperses loads over more of the stronger carcass. Tremendous rubber lugs form wide, sturdy reinforced shoulders. Through off-the-highway sand, gravel and mud, out and over-the-road the *General H. C. T.* delivers the load faster, safer, at lower cost. More rubber, more strength for more original miles—more dependable recap miles.

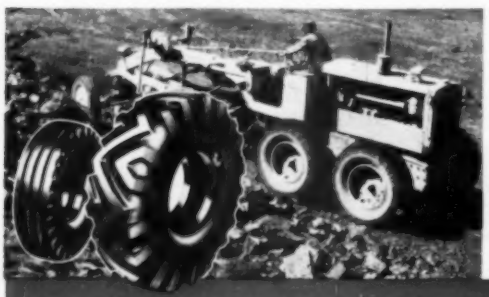
★

The General Tractor Grader Tire is built with thick, angled lugs of rubber that develop extra drive-wheel traction forward and backward. The deep-ribbed General Ribbed Grader for front or trailing wheels steer easier, last longer.

It is easier to figure any job anywhere on Top-Quality Generals and come up with more profit per load. If the job calls for 80% off-the-highway and 20% over-the-road then figure on the *General L. C. M.* Massive lugs of rubber angle over wide, sturdy shoulders for more flotation in soft going . . . more traction on any surface. And on-the-highway the *General L. C. M.* rolls smoother, steers easier, lasts longer, rides safer—rain or shine.

★

For extra drive-wheel power and traction in soft ground, sand and gravel, use the deep-ribbed General Non-Directional Cleated with the self-cleaning tread that digs deep, goes straight.



THE GENERAL TIRE & RUBBER CO., AKRON, OHIO

"How do you like married life?"

"I married the woman of my dreams. She is as beautiful as Mona Lisa. Her hands are as soft as swansdown. She dresses in perfect taste, and she is never the least bit mussed."

"So you don't regret it?"

"No—but I'm getting tired of eating in restaurants."

Tony (talking on phone to garageman): "I want you to come and feex my car—she no go."

Garageman: "What seems to be the trouble?"

Tony: "I dunno—but the battery, she not bat. The spark plugs da no spark. The generator, she no gin. The pistons—dey no work either."

The contractor, stopped by a policeman for speeding, angrily called the cop an ass . . . When he'd paid his fine the judge reproved him for what he'd said to the cop.

"Judge, you mean I shouldn't call a policeman an ass?"

"Certainly not," said the judge, "you must have respect for authority and not insult the police."

"Well, Judge," the contractor went on, "you wouldn't care if I called an ass a policeman, would you?"

The judge pondered this a moment then his eyes twinkled.

"Why, no, I suppose not."

The contractor turned to the officer who had arrested him: "Goodbye, policeman."

First Truck Driver: "A girl's greatest attraction is her hair."

Second Truck Driver: "No, I think it's her teeth. Boss, what do you think?"

Grade Foreman: "The same as you, boys, but I don't lie about it."

The young project engineer had cornered a very pretty girl at a party and was, naturally enough, trying to impress her with his views of love, life, death, history, civilization and whatnot.

"For instance," he was saying, "one trouble with modern society is that we are too specialized. Now, I happen to have a good background in civil engineering, but I must confess I haven't the faintest idea of how the radio works."

"My goodness," exclaimed the wide-eyed beauty. "It's easy. You just turn the knob and it plays."

NOT in the *Contract*

Joe: "If you have 10 dollars in one pocket and 15 dollars in the other, what have you?"

Bill: "I have on somebody else's pants."

Project Super: "You can't ask for a raise like that. You must work yourself up."

Straw Boss: "I did—I'm trembling all over."

Mountain Girl: "Doctah, Ah cum to see y'all about ma Grandmaw. We gotta do somethin' 'bout her smokin'."

Doctor: "Oh, now Elviry, I wouldn't fret too much about that. Lots a women smokes."

Mountain Girl: "Yeah, Ah know, but Grandmaw inhales."

Doctor: "I still wouldn't fret, Elviry. Lotsa women inhales."

Mountain Girl: "Ah knows thet—but Grandmaw don't exhale!"

Visiting Nurse: "Did you drink three pitchers of water and stay in bed like I told you?"

Patient: "I drank the water."

Said one girl to her friend, speaking of her two beaus: "If I could combine their qualities, I'd be the happiest girl in the world. Ronald is gay, debonair, rich, handsome and witty—and Clarence wants to marry me!"

Driving in a dense fog, a motorist followed the taillight ahead, free from worry. Suddenly the red beacon stopped and the cars collided.

"Hey, why don't you put out your hand when you're going to stop?" yelled the man behind.

Came the meek reply: "Should I, in my own garage?"

"I found this lipstick in the car John. Have you been out with that cosmetic salesman again?"

A rich old maid had a pet mamma cat she never let out of the house. Once she went on a summer cruise and her maid got a cable: "Having a wonderful time. Met a swell man. Having dinner and cocktails every night. P.S. —Let the cat out tonight."

"Next time go down to the filling station, Jerry, you're holding up the entire crew."

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date — 15 of preceding month. Example: January closes December 15th.

FOR SALE

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

200-W Bucyrus-Erie dragline
Cooper-Bessemer diesel engine
110' boom, 2-6cy. buckets
practically new
For Details Write Box 3326
c/o Excavating Engineer

ELECTRIC STRIPPING SHOVEL

Bucyrus 200-B equipped with crawlers and 10 yd. dipper for loading coal. Good condition, will make excellent 5 yd. stripping shovel.

Foley Brothers, Inc.
Colstrip, Montana

FOR SALE

1—Elec. shovel, Marion model 350; 8-10 c.y.

1—1600 HP, GM diesel.

Box 3325

Northwest model 25; 6; 80D; 95. Manitowoc 3500; 4500 new — will rent. Bucyrus 54-B; Monighan 5W; 7W; 9W; 450.

A. W. Nevers Phone 32 Mt. Pleasant, Iowa

BUCYRUS-ERIE 54-B diesel shovel.
NORTHWEST model 6 shovel.
NORTHWEST model 80 shovel.
Located Minnesota. Box 3329

For Sale
Two Bucyrus-Erie 22-B
¾ yd. draglines. 40 ft. booms.

Wayne Foster Howell, Michigan

P&H model 700 dragline, serial No. 3747 powered with Atlas Imperial diesel engine. Machine has standard track assembly, 60 foot boom, and is rated at 1¼ yard capacity. Entire machine in good operating condition. Excellent for yard crane or clam shell re-handling work. Price $7500 FOB cars New Mexico. Box 3317

1¼-yd. Koehring 376 combination dragline, clamshell, and shovel, serial C2339, with 50 ft. boom. Page dragline bucket and shovel front, powered by D8800 Caterpillar motor. Actual use about 3 years. Box 3324

Bucyrus-Erie 45-B dragline, shop No. 11480. No buckets. Wisconsin gasoline engine model E-2. Boom 70'0". Machine completely rebuilt including engine. Box 3330

1—P&H 150, ½ cu. yd. shovel with backhoe attachment, good condition. $5900.

1—Bucyrus-Erie 10-B shovel and crane and clamshell with special trailer. Nice condition. $6800.

T. Southworth Tractor & Machinery Company, Inc.
Glenwood Road-Menands, Albany 4, N. Y.
Phone: Albany 5-5255

Bucyrus-Erie 50-B steam shovel No. 10208. Located at Crosby, Minnesota. Box 3328

1—1¼ cu. yd. Osgood crane and backhoe — new General Motors diesel motor.
1—Model 255-A P&H, ⅝ yd. dragshovel and clamshell with gas engine. Excellent condition, approximately one year old.
1—Osgood model 200 ½ yd. shovel and crane gasoline engine, eight years old.
1—Osgood model 200 shovel and crane and backhoe with Chrysler engine, approximately three years old.
Backhoe with two buckets available for either above machines.
1—Model 255 P&H ¾ yd. dragshovel, crane, and dragline, approximately 10 years old.

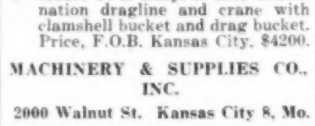
Stuart M. Christhilf & Company, Inc.
134-136 West Mt. Royal Ave. Baltimore 1, Md.

1—⅜ yd. Bucyrus-Erie late model 10-B shovel front end, used less than 500 hours, bargain.

1—¾ yd. Northwest shovel front end, brand new, never been in the dirt, bargain.

1—Model 10-B Bucyrus-Erie combination dragline and crane with clamshell bucket and drag bucket. Price, F.O.B. Kansas City, $4200.

MACHINERY & SUPPLIES CO., INC.
2000 Walnut St. Kansas City 8, Mo.



SHOVEL FRONT complete for model 70 Buckeye ¾ yd. machine. Perfect condition.

Nesbitt Equipment Company P. O. Box 11
Alexandria, Virginia
Telephone: OVerlook 3886

Lakewood finishing machine like new used only on ten miles of road. 18 and 20 foot width. $2000.

1600 feet metta steel road forms. 50c per foot, good condition.

One Keystone skimmer scoop with two trenching hoes. This machine is old, but has done very little work and has been stored in a good dry building. Price $1100. Prices are F.O.B. 320 Monroe Avenue, Evansville, Ind.

1—D8 tractor with D.D.P.C.U. 1—D8 tractor with D.D.P.C.U. and LeTourneau LP scraper. 1—3½ yd. 1201 Lima shovel bought new July 1946. 1—Pioneer 4 ft. x 10 ft. scalping screen. 1—Cummins L engine. 1—Caterpillar No. 12 Patrol. 1—210 cu. ft. I.R. compressor. Pumps and other misc. items. More shovels and Euclids available in 60 days. All subject to prior sale. Granby Constructors, 2401 W. 8th Ave., Denver, Colorado.

BUSINESS FOR SALE

Owners offering complete contracting business and all equipment. Nearly new. List of equipment on request. Good location. No competition. Owner has other business. Investment required $60,000. Box 3333

MECHANICS — HOME STUDY. Step up your own skill with facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in handy form. Fully illustrated. Easy to Understand. Highly endorsed. Check book you want for 7 days' Free Examination. Send no money. Nothing to pay postman. ☐ Carpentry $6, ☐ Auto $4, ☐ Oil Burners $1, ☐ Sheet Metal $1, ☐ Welding $1, ☐ Refrigeration $4, ☐ Plumbing $6, ☐ Masonry $6, ☐ Painting $2, ☐ Radio $4, ☐ Electricity $4, ☐ Mathematics $2, ☐ Steam Engineers $4, ☐ Machinist $4, ☐ Blueprint $2, ☐ Diesel $2, ☐ Drawing $2. If satisfied you pay only $1 a month until price is paid.

AUDEL Publishers
49 W. 23 St. New York 10, N. Y.

Bucyrus-Erie 22-T gasoline powered blast hole drill Shop No. 47465 with drill tools and trailer for drill. Franklin & Palmer, 127 Montgomery Street (Room 402), San Francisco, California.

One Esco rehandling dipper No. 832, 8 cubic yard capacity, with back arrangement for Bucyrus 120-B.

Weight of the can	14,020 lbs.
Weight of the bale	1,280 lbs.
Total	15,300 lbs.

Condition "Like new." Price $4,000 F.O.B.

Permanente Cement Co. Permanente, Calif.
Contact Mr. R. R. Little

"TIRES" 20x1700. $68. With tube. UNUSED. Weight: 172 pounds. Airplane Tire Company, Box 1201-P, Tulare 3, California.

BARGAINS
In Used Construction Equipment

PULVI-MIXER, SEAMAN, with Buda 6-cylinder engine. Rebuilt. A-No. 1 condition. Price $ 900

SCALE, FAIRBANKS, platform, 10-ton capacity, 2-beam. Price $ 395

MOTOR GRADER, CATERPILLAR, diesel, model No. 11, tandem drive. A bargain at Evansville, Indiana, branch. Price $2500

TRACTOR AND DOZER, CATERPILLAR RD4, diesel equipped with LeTourneau straight bulldozer and LeTourneau rear single drum cable control. Has been reconditioned, cleaned and painted. Price $3850

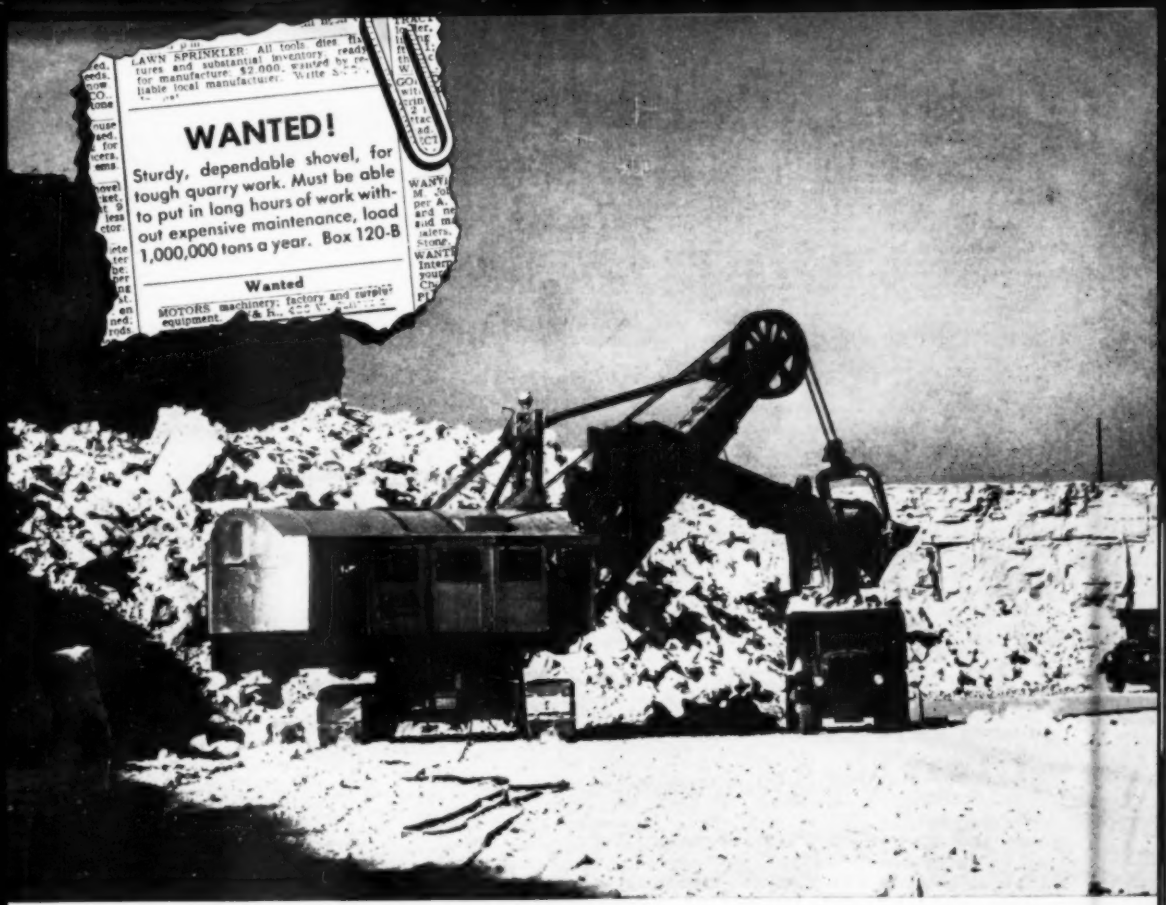
TRACTOR AND DOZER, CATERPILLAR RD6, equipped with LaPlant-Choate hydraulic straight dozer and Hyster winch. Old tractor but in running condition. Price $2600

SCRAPER, LETOURNEAU, model G, 6.5 cu. yd. heaped capacity, single bucket, cable control. Very good condition. Price $1550 f.o.b. Paducah, Kentucky.

Write—F. L. Bennett, 800 West Main Street, Louisville, Kentucky for details and complete used equipment catalog.

ROY C. WHAYNE SUPPLY COMPANY
Evansville, Ind. Louisville, Ky. Paducah, Ky.

Continued on page 56


WANTED!
Sturdy, dependable shovel, for tough quarry work. Must be able to put in long hours of work without expensive maintenance, load 1,000,000 tons a year. Box 120-B
Wanted

Let EXPERIENCE *Answer!*

Since 1926, this Bucyrus 120-B shovel has been at work in the Maple Grove plant of Basic Refractories, Inc., handling dolomite at an average annual rate of 1,000,000 tons — year in, year out.

This is the kind of excavator dependability that builds profits through years of successful operation in the toughest kinds of jobs . . . the dependability characteristic of Bucyrus-Erie quarry and mine machines today as in the past . . . the "years ahead" design, high grade materials and skilled craftsmanship that have always made Bucyrus-Eries first choice wherever sustained high production is a "must".

Let experience be your guide in choosing your excavator — the experience of satisfied owners, and the experience of Bucyrus-Erie, oldest and largest manufacturer of excavating equipment in the world.

64L49c

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

For Sale

Continued from page 54

Bucyrus-Erie 29-T diesel drill, No. 21264, caterpillar type mounting Caterpillar diesel engine. Recently overhauled. Ready for immediate shipment. John Pitcher, 7108 Mission Street, Daly City, California.

One Bucyrus-Erie 27-T cat mounted churn drill, Serial 24111, powered by Caterpillar diesel model D-3400 engine. Auxiliary equipment includes drill stems, bits, bailer and tool wrenches. Drill has 40' mast. Box 3331

1—(Used) Jaeger concrete batch mixer with skip and shaker, equipped with water pump and automatic proportioner, mounted two wheels, rubber mechanically like new, has mixed only 700 sacks. 2974. Barnes Bros., Washburn, Illinois.

1—Cedarapids unitized crushing plant.
1—Bucyrus-Erie 120-H steam shovel, 5 yard.
2—Bucyrus-Erie 50-B steam shovels, 1¾ yard.
1—General Motors Twin power diesel unit, model 12103.
2—Allis-Chalmers synchronous motors, 150 hp, 360 R.P.M.
Telephone or write—MUrray Hill 9-8500.
New York Trap Rock Corporation
230 Park Avenue New York 17, New York

Dragline front end for Bucyrus-Erie 120-B (Machine No. 12016). Includes 100' boom, fairleads, drum, pedestal, bands, etc., and 4-yd. Page bucket. Box 3320

Bucyrus-Erie No. 8 bit dresser. Complete and in perfect operating condition. Located in Washington State. Box 3271

Placer dredges, 4½', 6', 7½', elec., diesel.
Bucyrus 200-B elec. shovel, 10-yd., on cats.
Bucyrus 50-B 2-yd. steam shovel, crane.
Whirley gantry crane, elec., 120' boom.
60-ton steam barge crane, 75' boom.
Buckeye trenchers, 120, 160, 201, 203, 224.
B-Monighan 200-W diesel dragline, 1948.
Air compressor, 1574', diesel, 300 HP.
Nordberg 1250 HP diesel elec. gen. units.
F-Morse marine diesel engine, 805 HP.
Buchanan 40"x48" Style C steel jaw crusher.
30" Superior McCully gyratory crusher.
Whitcomb 7-ton gas dinkey, 36" ga., reblt.
Porter, Vulcan 18-ton steam locos., 36" ga.
B-Erie 2½ yd. shovel front att., 52B-55B.
H. Y. Smith Co., 828 N. B'way., Milw. 2, Wis.

New Dragline Buckets

1¼ cubic yard Red Arch Type AX Medium duty bucket.
2-¼ cubic yard Red Arch, Type AX medium duty bucket.
3 cubic yard Red Arch, Type AY heavy duty bucket.
5 cubic yard Red Arch, Type AY heavy duty bucket.
6 cubic yard Red Arch, Type AY heavy duty bucket.

Bucyrus-Erie Company
Parts Division
South Milwaukee, Wisconsin

One Lorain 40 cubic crowd shovel front complete with boom, stick and ⅝ cubic yard bucket. Priced right for quick sale. Box 3321

WANTED

Wanted: Two walking draglines, new or second-hand, with largest possible capacity and greatest possible reach over 200 feet. Prefer both machines same make and model but will consider offers of individual units irrespective of size. Frank L. Findlay, Fenchurch Export Corporation, 37 Wall Street, New York 5, New York.

Wanted: Complete chain crowd shovel front end equipment for Bucyrus-Erie 32-B dragline. Box 3319

HELP WANTED

Sales representative with knowledge of or experienced in selling all types of earth moving equipment for work with Middle Western IHC distributor. Prefer ages 28 to 35. Position offers salary, car, expenses and very liberal commissions on average to good sales volume. Reply should include age, educational background, experience, references and family status. Box 3332

POSITION WANTED

Position wanted as shovel operator. Can operate any make of machine; shovel; dragline; clamshell, or crane. Steam, gas, diesel or electric. Large or small machines. Box 3317

New trade literature

Title: **Diesel Catalog**
Subject: An illustrated folder describes a newly-designed 4-cycle, 6-cylinder, 150-hp diesel engine. Diagrams and photos show cross sections of the various parts. Text lists advantages of the engine's special features. A companion piece to this publication is another booklet entitled "Understanding the Automotive Diesel." This 67-page booklet in non-technical language is packed with general information about diesel engines from a short history and contrasts with other types of engines to discussions of diesel fuels, various combustion systems, fuel injection, engine control and numerous other subjects. It should be of interest to anyone owning diesel equipment as well as to prospective owners.
Where To Get: Mack-International Motor Truck Corp., 350 5th Ave., New York 1, N. Y. (Free)

Title: **Piling Rental Service**
Subject: A 4-page, 2-color folder for contractors lists the advantages of an interlocking sheet piling rental service. It outlines how the service is conducted and gives a listing of the manufacturers' products.
Where To Get: L. B. Foster Co., P. O. Box 1647, Pittsburgh, Pa. Ask for Number F120 3-49. (Free)

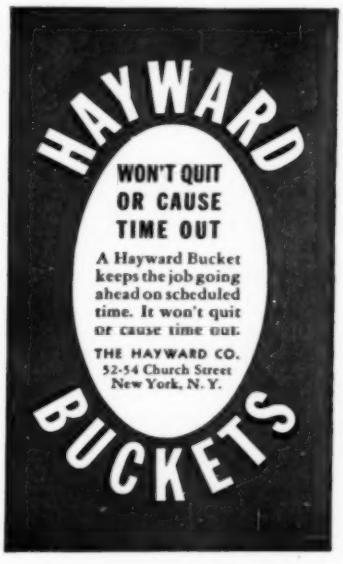
Title: **Wire Rope Folder**
Subject: A new folder gives answers to the 20 most common questions asked about Preformed wire rope.
Where To Get: Macwhyte Co., Kenosha, Wis. (Free)

Title: **Locomotive Crane Catalog**
Subject: The 20 pages of a new catalog describes a 30-ton diesel locomotive crane. It contains illustrations of the crane in different types of work as well as mechanical illustrations. Parts and general specifications are also included.
Where to Get: Advertising Department, American Hoist and Derrick Co., St. Paul 1, Minn. Ask for Catalog 600-L-6. (Free)

Title: **Wire Screen Specifications**
Subject: Various aggregate wire screens are illustrated and described in a well-arranged, easy-to-read booklet just released. Complete specifications are included.
Where To Get: John A. Roebling's Sons Co., Trenton 2, N. J. (Free)

Title: **Motor Grader Manual**
Subject: A new service manual covers the operation, maintenance and major repair of AD-3 and AD-4 motor graders. The 278-page book features 26 sections ranging from descriptions and specifications to fits and tolerances.
Where To Get: Allis-Chalmers Mfg. Co., Tractor Division Service Department, Box 512, Milwaukee 1, Wis., or any Allis-Chalmers Industrial dealer. (Price, $4.00)

Title: **Diesel History**
Subject: An informative booklet, "Diesel Development in the United States," traces the history of the diesel engine in this country, beginning with the part played by Rudolph Diesel, originator of this engine type. Illustrations show various models built through the years of development.
Where To Get: Worthington Pump and Machinery Corp., Harrison, N. J. (Free)


HAYWARD
WON'T QUIT OR CAUSE TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD CO.
52-54 Church Street
New York, N. Y.
BUCKETS

New Places for

PREFORMED WIRE ROPE

Men who build new machines and men who run old ones know that Preformed Wire Rope is an efficient, economical and dependable medium for transmitting motion.

BECAUSE—

- Preformed lasts longer
- Preformed handles easier
- Preformed is safer to use
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Now is the time to take advantage of the savings Preformed wire rope offers. Ask your supplier about it. Then specify Preformed wire rope on your next order.

LOW BIDDERS--

Need WAYNE CRANE *Now!*

For Economies that make more Profits—both the Model 22 and the Model 44 Corsair

DO SO MANY DIFFERENT JOBS *Quicker-Better*

SPECIFICATIONS
Model 22 as a Shovel • ½-yard • 5-ton Self-propelled • One-man Operation

SPECIFICATIONS
Model 44 "Corsair" as a Truck Crane • ½-yard • 10-ton Tandem Drive • 10 Speeds forward, 2 reverse

WAYNE CRANE MODEL 44 "Corsair"

offers truck speeds on the highway PLUS added power and traction for on-the-job work. The full-vision cabs simplify signaling between operator and driver. Easily convertible to all attachments, the Corsair is designed throughout to provide maximum stability.

MODEL 22 IS A

real PROFIT-MAKER on basement, sewer, ditch and all similar jobs. 360° operation with equal efficiency and stability. Short turning radius and 92" wheelbase mean maximum maneuverability. One-man operation—single engine power—easy to maintain and lubricate. Both operators and mechanics like Wayne Crane. Easily convertible to trench hoe, dragline, clamshell, crane and magnet.

WAYNE CRANE owners know that these machines cost less to operate. We know it because our "parts" business is small.

Operating cost is again MIGHTY IMPORTANT—bids are lower—profits are smaller. Better look at Wayne Crane NOW. These machines are real COST-CUTTERS.

YOU ARE INVITED

to visit or call a Wayne Crane Distributor for help on any equipment problem. They are good men to know. Complete service and parts facilities are maintained by Wayne Crane Distributors in all principal cities.

Mfd. by WAYNE CRANE DIVISION—AMERICAN STEEL DREDGE COMPANY INC.—Fort Wayne 1, Indiana, U. S. A.